



ROYAL BOTANIC GARDENS, KEW

BULLETIN OF MISCELLANEOUS INFORMATION

APPENDIX, 1934

REVIEW OF THE WORK OF THE ROYAL BOTANIC
GARDENS, KEW, DURING 1934

LONDON

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ROYAL BOTANIC GARDENS, KEW.

LIST OF STAFFS.

31ST DECEMBER, 1934.

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Jodrell Laboratory.

- ASSISTANT KEEPER—C. R. Metcalfe, M.A., Ph.D.

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- KEEPER—W. Dallimore, V.M.H.
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Gardens.

- CURATOR—J. Coutts, V.M.H.
ASSISTANT CURATORS—A. Osborn (*Arboretum*).
C. P. Raffill (*Temperate*).
L. Stenning (*Tropical*).
G. W. Robinson (*Herbaceous*).
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REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1934.

General.

STAFF.—Mr. J. H. HOLLAND, F.L.S., retired on October 17th having served for 33 years as Assistant in the Museums, and Mr. R. MELVILLE, B.Sc., Ph.D., Ph.C., was appointed to fill the vacancy.

Mr. R. A. DYER, Assistant for South Africa, returned to Pretoria after his period of 3½ years working in the Herbarium and his place has been filled by the appointment of Mr. H. G. SCHWEICKERDT, B.Sc., Ph.D., by the Government of the Union of South Africa.

Dr. N. E. BROWN. Kew and South African Botany in particular suffered a great loss in the death on November 25th of Dr. N. E. BROWN, A.L.S., for many years Assistant in the Herbarium. His last paper completed shortly before his death, on the genus *Freesia*, has recently been published in the new journal emanating from Kirstenbosch—"The South African Journal of Botany."

The death on January 29th of Dr. D. H. SCOTT, Hon. Keeper of the Jodrell Laboratory (1892-1906), was a deeply deplored loss.

We also record with regret the death on April 23rd of Mr. WALTER IRVING, who was in charge of the Herbaceous Department from 1893 to 1928 (K.B. 1928, 301).

Mr. A. D. COTTON, Keeper of the Herbarium and Library, received the Honour of the O.B.E. in the King's Birthday Honours, and the University of St. Andrews conferred the Hon. Degree of LL.D. on Mr. J. HUTCHINSON, Botanist in the Herbarium, on the occasion of the installation of General the Right Hon. J. C. Smuts, F.R.S., as Rector of the University on October 16th, 1934.

The DIRECTOR was elected a Corresponding Member of the Botanical Society of New York, and an Honorary Member of the Pennsylvania Horticultural Society.

OFFICIAL VISITS.—Mr. H. C. SAMPSON visited the Tana River region in the Northern Frontier Province of Kenya Colony, at the request of the Rt. Hon. the Secretary of State for the Colonies, to examine and report on the possibilities of agricultural development in that area. For this purpose he was seconded to the Colonial Office. His mission, in which he was associated with Mr. D. G. HARRIS, C.S.I., late Consulting Engineer to the Government of India, occupied five months. At the request of the Kenya

Government, Mr. Harris and he also visited other areas where the Government had minor irrigation and drainage prospects in view. These areas included the Kano Plains in Central Kavirondo, the country south of Lake Baringo in the Kamasia Reserve, and the Lumi River area at the foot of Mount Kilimanjaro. The Governor and the Secretary of State for the Colonies have expressed their thanks to these officers for their valuable services. In the course of the expedition Mr. Sampson was able to make some interesting collections and has added considerably to our knowledge of the regions.

BANANA RESEARCH.—During the year a further series of varieties was received from the Department of Agriculture, Madras, and, after passing through quarantine, suckers of Burmese, Bombay and a few Madras varieties were despatched to the Imperial College of Tropical Agriculture, Trinidad. Improvements were made in the ventilation of the Banana Quarantine House.

PUBLICATIONS.—Ten numbers of the Kew Bulletin were published during the year, and the Review of the work during the year 1933 was published as a separate appendix. The List of Seeds, also, as before, was published as a separate pamphlet.

The new (fourth) edition of the Hand-List of Trees and Shrubs (excluding Conifers) cultivated at Kew, was published in August, and the new (fourth) edition of the Hand-List of Rock Garden Plants in September. The latter now contains a list of Monocotyledonous plants and also an appendix of trees and shrubs suitable for cultivation in rock gardens. The second volume of Dr. Hutchinson's "Families of Flowering Plants" (Monocotyledons) was published during the year.

The Gardens.

VISITORS.—The number of visitors to the Gardens in 1934 was 1,170,369—weekdays (not students' days) 552,583; students' days 96,000; Sundays 521,786—a decrease of 55,688 as compared with the figures for 1933.

The greatest monthly attendance was in May with 329,477, and the lowest in December with 7,545. The highest daily attendance was 73,644 on Whit-Monday, May 21st; the lowest was 6 on January 9th.

GENERAL.—The summer of 1934, as of the previous year, was characterized by prolonged spells of dry weather which again entailed much extra labour in watering. In spite of this, however, the quantity used (31,731,000 gallons) was considerably less than during 1933, due to the flow to the streams in the rock garden being reduced to the minimum. The plants generally do not seem to have suffered through the dry weather to any extent, although it is too early to say how some of the older trees may ultimately be affected. As a result of the hot summer the plant of *Diospyros kaki* on a southern wall produced a very large crop of fruit, whilst

Ilex macrocarpa, for the first time at Kew, gave a heavy yield of its purple-black berries. *Aegle sepiaria* also fruited well, and *Catalpa Fargesii* and *C. Duclouxii* flowered freely for the first time.

DECORATIVE DEPARTMENT.—Pits 17D and 17E have been reconstructed on modern lines and, as an experiment, all the wood used is of western red cedar (*Thuja plicata*). A new concrete staging has been built in the bulb pit and the interior woodwork of pits 18A, B, C, and F has been painted. In addition to the painting of the interior of the structure, the hot water pipes in 17C have been overhauled and rearranged. A sectional boiler—in place of three old saddle boilers—has been installed in the large stokehole, and the roof spanning the potting and packing sheds has been rebuilt, the old tiles being used again.

HERBACEOUS DEPARTMENT.—Amongst the more interesting plants which have flowered in this department during the past year may be mentioned the following: *Primula eburnea* and *Cypripedium cordigerum* collected in Bhutan by Ludlow and Sheriff and presented by Mr. J. Ramsbottom; *Lewisia brachycalyx*, *Campanula Piperi*, *Calceolaria Darwinii* and *Hypseocharis tridentata*, the last-mentioned collected by Miss D. Stafford in the Peruvian Andes. The Duchess Wall has been repointed and the opportunity taken to remove new bricks from several patched areas and to replace them by old bricks similar to those of the rest of the wall.

ARBORETUM.—The ground under the trees at the east end of the lake, which was cleared of undergrowth last winter, has been sown down to grass, thus greatly improving the appearance of this part of the gardens. The water pumping station near the Arboretum Nursery being no longer required for that purpose, the opportunity was taken to provide accommodation for the motor lorry, carts, etc., under one roof. A petrol pump has also been installed in the stable yard. In the Depot Nursery the trees and shrubs which formed a very inadequate screen on the Brentford side have been cleared out and replanted with young *Quercus Ilex* and suitable evergreen shrubs. At the same time a portion of the ground was reclaimed for the Arboretum Nursery and a service road was constructed right around the nursery.

Two hybrid Rhododendrons raised at Kew, viz. *Rhododendron impeanum* and *R. Willulare*, were exhibited at the Royal Horticultural Society and gained a First Class Certificate and an Award of Merit respectively. Later in the year the former was awarded the Cory Cup.

TROPICAL DEPARTMENT.—Palm House. The hot water pipes in the S.W. end have been overhauled, relevelled and installed with new six and twelve-inch mains. The iron work under the paths and beds has been repaired or renewed where necessary.

"T" Range.—The roof of the Nepenthes House has been overhauled thoroughly and painted. This work necessitated the clearing of the house, thus affording opportunity for introducing fresh compost for the replanting of the beds.

Fereries.—The roof of the wing of House 2 has been renewed and painted both inside and out, whilst exterior and interior painting has also been done in 3, 5, 6 and 6A.

Orchid Pits.—New hot water mains have been installed to supply 14, 14C and 15C while the hot water pipes in 15A and 15B have been releveled. The exterior and interior of 14, 14C, and 15A, B, and C have been repainted, and new rain water tanks constructed in 14, 15A and 15B. New concrete benches have been constructed in all the orchid pits, each being fitted with movable narrow-slatted wooden staging made of western red cedar.

Insectivorous House.—The original slate staging has been replaced by a concrete trough which will allow the plants either to be planted out or plunged in pots in a bed of peat and sphagnum, thus producing a more natural and pleasing effect ; at the same time the hot water pipes were rearranged.

Clusia grandiflora produced a quantity of its beautiful flowers, while the *Phyllocactus* spp. in the Sherman Hoyt Cactus House have flowered very freely, the conditions evidently suiting them.

The workmen's mess rooms in the Office and Stable Yards have been redecorated, glazed sky-lights installed in the roofs, and the old wooden tables replaced by small tables with enamelled tops.

The Curator's office block and Students' Library were repainted and additional accommodation for the clerical staff was provided.

STUDENT GARDENERS.—The position regarding the movements of students still continues to be satisfactory and shows a further improvement upon that of last year.

Outgoing Students.—Nineteen men completed their training and secured appointments as follows :—Home.—Parks Departments—eight; nurseries or private gardens—six.

Overseas.—Tanganyika Territory—one ; Italy—one ; South Africa—one ; Bolivia—one ; New Zealand (Wellington Botanic Garden)—one.

One student returned from La Mortola but afterwards secured a permanent appointment on the Riviera.

New Entrants.—Nineteen men—all British subjects—were appointed to full course vacancies and were recruited as follows :—

Parks Departments—four ; Botanic Garden, Cambridge—one ; nurseries or private gardens—ten ; Reading University—one ; Canada—one ; New Zealand—one, and South Africa—one.

Under the exchange of students arrangement, men were entered from Berlin Botanic Garden, Rouen, and La Mortola respectively, Kew students proceeding to the establishments whence they came.

Five volunteer students were admitted, for varying periods, as follows:—Great Britain—one; South Africa—one; Holland—two; Switzerland—one.

RAINFALL RECORD.

Rainfall recorded at the Royal Botanic Gardens, Kew, during 1934:

Inches.			Inches.		
January	...	1.24	July	...	1.49
February	...	.23	August	...	1.82
March	...	2.13	September	...	1.03
April	...	1.47	October	...	.91
May	...	.44	November	...	1.56
June	...	1.23	December	...	4.70

Total 18.25 inches.

The total for 1933 was 18.54 inches.

WATERFOWL.—Monsieur Jean Delacour presented two pairs of Paradise Shelducks, also some Australian and Madagascan Mallards. It is believed that none of these species has been previously introduced at Kew.

CONTRIBUTIONS TO THE GARDENS, 1934.—During the year, 1073 separate consignments of living plants, bulbs, seeds, etc., were received, a slight decrease as compared with the figure (1107) for 1933. The following is a summary of the items of most interest:—

Public Institutions:—

Auckland, Institute and Museum, New Zealand.—Plants and seeds of *Xeronema Callistemon*, also seeds of hybrid Gaultherias.

Bermuda, Department of Agriculture.—Two Wardian cases containing Begonias, stove subjects and ferns, also a consignment of bulbs of *Lilium longiflorum* var. *eximium*.

Bristol, Department of Botany, the University.—Plants: *Wolfia arrhiza*, *Hydrocharis Morsus-ranae*, *Leucojum aestivum*.

British Museum (Nat. Hist.).—Seeds and plants collected in Bhutan by Mr. F. Ludlow and Captain G. Sheriff.

Cambridge, Botanic Garden.—Plants, species and varieties of *Phyllanthus*, *Adiantum*, *Selaginella*, *Saururus*, etc., and various seeds.

Coimbatore, Agricultural College.—A consignment of banana suckers.

Coimbra, Botanic Gardens, Portugal.—Propagating material of three species of *Peperomia*, also *Mesembryanthemum spectabile*; seeds of *Anthurium dentatum* and *Quercus* spp.

Cologne, Botanic Garden.—Plants of *Marsilia quadrifolia*, also 20 packets of seeds and fern spores.

Cyprus, Department of Agriculture.—Seeds of *Rhus coriaria*.

Darjeeling, Lloyd Botanic Gardens.—96 packets of seeds of Himalayan plants.

- Dunedin, Botanic Gardens.—A collection of plants of *Hymenophyllum* spp., in excellent condition, also large consignments of seeds.
- Durban, Natal Herbarium.—Seeds of *Tephrosia macropoda*.
- Edinburgh, Royal Botanic Garden.—Miscellaneous collections of plants, seeds and cuttings.
- Falkland Islands, the Acting Colonial Secretary.—Plants of *Calceolaria Fothergillii* and *Primula farinosa* var. *magellanica*.
- Genoa, University Botanic Garden.—A generous collection of seeds and fern spores.
- Georgetown, Department of Agriculture, British Guiana.—11 packets of tropical seeds and rhizomes of *Zingiber officinalis*.
- Gothenburg, Botanic Garden.—Interesting collections of plants and seeds.
- Grahamstown, Albany Museum.—Plants of new species of *Euphorbia* and *Ceropegia*.
- Hobart, Botanic Garden.—Seed of a species of *Epacris*, probably new to Tasmania.
- Hong Kong, Botanical and Forestry Department.—Seeds of *Aleurites montana* from the experimental plantations in the Colony.
- Hong Kong, the University.—Several consignments of seeds, including *Camellia drupifera*, *Bauhinia glauca*, *Mucuna Cham-pdioni*, *Gelsemium elegans*, *Argyreia speciosa*.
- Hyde Park, London.—Plants, including shrubs from Nepal, seeds of *Gentiana superba*, *G. argentea* and many Australian subjects.
- John Innes Horticultural Institution, Merton.—Several consignments of plants including *Primula sinensis* varieties, *Calceolaria* hybrids, a collection of cuttings of scented leaf Pelargoniums and various seeds.
- Jamaica, Department of Agriculture.—Plants of *Arracacha esculenta*.
- Khartoum, Government Gardens.—A Wardian case of plants, also seeds of *Balanites aegyptiaca*.
- Kimberley, McGregor Memorial Museum. Seeds of *Acacia*, *Arctotis*, *Gazania* spp., etc., also bulbs of *Dipcadi* sp.
- Kirstenbosch, National Botanic Gardens.—92 packets of seeds.
- Laguna, Philippine Islands, Los Banos Economic Garden.—Seeds of *Macrozanonia macrocarpa*, also *Spathiphyllum* species.
- London County Council, Parks Department.—A collection of trees and shrubs.
- Mount Everest Expedition, 1933.—Seeds of a new species of *Mandragora*, collected at Tinkye-la (16,000 ft. altitude).
- Nairobi, Coryndon Memorial Museum.—Plants and cuttings of species of *Epidendrum*, *Caralluma*, *Stapelia* and *Huernia*.
- New York, Botanic Garden.—Several large and interesting consignments of plants and seeds.
- Nigeria, Forests Department.—Fruits of *Parinari macrophylla*.

- Oxford, Imperial Forestry Institute.—Seeds of *Dombeya Johnstonei*.
- Oxford University Expedition to New Hebrides.—Plants of *Eria* spp., and *Coelogyne* sp.?
- Peiping, Fan Memorial Institute of Biology.—Seeds of *Rehderodendron macrocarpum*.
- Peradeniya, Royal Botanic Garden.—Large shipments of stove and economic plants, orchids and ferns, also palm seeds. Special reference must be made of the receipt of a plant of *Palavicinius decipiens*.
- Port Elizabeth, Parks & Town Attractions Department.—Several very generous consignments of seeds, plants and bulbs. In particular, mention must be made of a plant believed to be a rare species of *Pachypodium* or *Rathbonia*.
- Pretoria, Division of Plant Industry.—A collection of succulents also seeds of *Aloë rubrolutea*.
- Singapore, Botanic Garden.—A Wardian case of plants comprising species of *Scyphostegia*, *Dipteris* and *Spathoglottis*, also seeds of *Boea* sp. from Langkawi Islands. *Dipteris*, unfortunately, did not survive the journey.
- Southampton, University College.—Plants, including *Stanhopea costaricensis*, *Aspasia principissa* and *Scaphyglottis brachiata*.
- St. Louis, Missouri Botanical Garden.—A collection of tubers of species and varieties of *Nymphaea*.
- Stellenbosch, University Botanic Garden.—184 packets of seeds.
- Stockholm, Botanic Garden.—28 packets of seeds and cuttings, including *Victoria regia* var. *Cruziana*.
- Sydney, Botanic Garden.—27 packets of seeds, a bulb of *Crinum* "Granthum" and corms of 8 species and varieties of *Watsonia*.
- Tanganyika, Department of Agriculture, Morogoro.—Seeds of wild coffee from Iringa Province.
- Trinidad, Department of Agriculture.—A collection of orchids and several packets of seeds including *Mora excelsa*.
- Trinidad, Imperial College of Tropical Agriculture.—Cacao pods for germination experiments.
- Tucson, Arizona, Desert Laboratory.—Seeds of *Larrea mexicana*.
- Warsaw, Botanic Garden.—Plants of *Rhoeo discolor*, *Marsilia quadrifolia*, and *Selaginella denticulata*, also 21 packets of seeds.
- Washington, U.S. Department of Agriculture.—A collection of tubers of species and varieties of *Xanthosoma* and *Colocasia*, also seeds—various.
- Wisley, Royal Horticultural Society's Gardens.—Collections of trees, shrubs, alpiners, etc.

Private Donors :—

- Lord Aberconway, Bodnant.—Large consignments of seeds from China.
- Mr. B. P. Allinson, London.—Plants of *Dioscorea pyrenaica*.
- Mr. W. K. W. Baldwin, Toronto.—A collection of native ferns.

- Mr. E. K. Balls, Knebworth.—Seeds collected in Turkey in 1934.
- Col. C. Beddington, Ospedaletti, Italy.—A miscellaneous collection of succulents.
- Mr. Robert Berkeley, Worcester.—A large number of species and varieties of *Pelargonium* from the collection of the late Miss E. Willmott, Warley.
- Major W. T. Blake, London.—Seeds collected in different parts of Africa.
- The Lord Bledisloe, Government House, New Zealand.—Seeds of *Leptospermum scoparium*.
- Mr. E. G. Bryant, Prieska, South Africa.—Bulbs of *Urginea Burkei*, *Crinum* sp., plants of *Euphorbia* sp. and tuber of *Telinum caffrum*.
- Mr. B. D. Burt, Tanganyika Territory.—Plants of *Stapelia* and *Caralluma* species, also seeds of *Lupinus Princei*.
- Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames.—Shrubs.
- Mr. J. Cadman, Royal Colonial Institute, London.—Seeds of *Astrocaryum tucuma* and *Orbignya Dammeriana*.
- Miss M. Chadwick, Stratford-on-Avon.—Seeds, including *Gentiana carinata*, a rare species which flowered in September 1934.
- Mr. T. North Christie, Morayshire.—A collection of seedlings of *Primula* spp., plant of *Rhododendron lepidostylum* and bulblets of *Vallota purpurea*.
- Mr. P. L. Dunsdon, Caledon, South Africa.—Seeds, including *Pelargonium roseum*, *Arctotis Fosteri*, *Cheiridopsis Pillansii*, *Ursinia*, *Greuleum*, *Dimorphotheca* and *Gazania* spp.
- Mr. Charles Ely, East Bergholt.—A collection of plants and cuttings of hardy subjects.
- Lady Muriel Jex-Blake, Nairobi.—Plants of *Edithcolea grandis*, *Kalanchoë marmorata*, a collection of botanical orchids, bulbs of *Brunsvigia* sp.(?), seedlings of *Gladiolus* species and seeds.
- Captain Esme Erskine, Gore, Western Abyssinia.—Seeds of *Clematis incisodentata* (?), *Impatiens orchestris* and probably *Cyanotis hirsuta*.
- Mr. R. G. Evans, Nova Scotia.—Plants of *Sarracenia* sp.
- Mr. Nils Fogelqvist, Kalmar, Sweden.—Plants of *Orchis* and *Gymnadenia* spp. and varieties.
- Mr. C. S. Garnett, Derby.—Plants, *Coryanthes Hunteriana* and *Cymbidium alatifolium*; tuber of *Hedychium* sp.
- Mrs. S. K. Garnett-Botfield, Wolverhampton.—Bulbs of *Scilla Adlami* collected in Natal, a rare species.
- Sir Eric Geddes, Hassocks.—Plants of *Lycopodium*, *Pellaea*, *Asplenium* and *Cheilanthes* spp.
- Mr. A. V. Giblin, Hobart, Tasmania.—Seeds of *Cyathodes acerosa*, *Eucalyptus Perriniana* and *E. coccifera*.
- Mr. P. J. Greenway, Tanganyika Territory.—A Wardian case of orchids, also miscellaneous seeds, corms and roots.

- Colonel C. H. Grey, Cranbrook.—Plants, including alpine subjects collected in Utah, Montana, and Central California.
- Mr. E. R. Guest, late of Iraq.—Seeds—various.
- Mr. Cecil Hanbury, La Mortola.—Plants and seeds.
- Mr. F. J. Hanbury, East Grinstead.—Plants, including a number of alpine subjects.
- Mr. H. Harris, London.—A miscellaneous collection of plants, bulbs and seeds collected in South Africa.
- Mr. G. B. Hinton, Mexico.—Several large consignments of seeds, in particular *Quercus* spp.
- Mr. Murray Horne, Hereford.—Plants of *Dyssodia speciosa*, new to cultivation in England.
- Captain Collingwood Ingram, Beneden, Kent.—Plants of *Prunus prostrata*, *P. mutabilis* var. *rubra*, *Eucryphia* hybrid and seeds of *Tetraphaëa tetandra*.
- Messrs. George Jackman & Son, Woking.—Collection of trees and shrubs.
- Mr. C. Jinarajadasa, Madras.—Seeds collected in Costa Rica, Cuba and Panama.
- Major L. Johnston, Hidcote, Glos.—Varied collections of plants, seeds and cuttings, including consignments from the Riviera.
- Captain H. A. Johnstone, London.—A large collection of palm seeds from Pará.
- Miss M. Karsten, Gelderland, Holland.—A collection of South African succulents.
- Dr. A. F. G. Kerr, Hayes, Kent.—Plants of *Eulophia Keithii* and *Saccolabium miniatum* from Siam, also ?*Decaschistia* sp. from French Laos. Seeds of *Afgekia sericea*.
- Colonel W. G. King, Hendon.—A seedling of *Entada scandens* raised from seed collected in 1910.
- Knap Hill Nursery Ltd., Woking.—Plants, bulbs and seeds.
- Mr. C. H. Lankester, Costa Rica.—Several interesting consignments of botanical orchids and various seeds.
- Mr. B. Levy, S. Rhodesia.—Plants, including *Tavarissia grandiflora*, *Caralluma Lugardii*(?), *Huernia* and *Stapelia* spp., also *Anacampseros fissia* ; seeds—4 packets.
- Captain C. C. Lilley, Kpandu, Gold Coast.—A most interesting collection of bulbs and tubers including species of *Lissochilus*, *Angraecum*, *Eulophia*, *Haemanthus*, *Amorphophallus* and *Crinum*.
- Mrs. F. S. Loch, Chalchidiki, Greece.—Seeds from Rat Island, including *Matthiola sinuata*, a dark form of *Cercis siliquastrum*, and *Verbascum banaticum*.
- Mr. R. H. Macaulay, Argyll.—Plants of *Gentiana sino-ornata* and *Gentiana Macaulayi*.
- Mr. James MacGregor, Glasgow.—Plants and seeds—alpines.
- Mr. E. Magor, Lamellen, Cornwall.—Seeds of *Nandina domestica* var. *rubro-marginata* ; seedlings of *Crawfurdia trinervis* and *Leucothoe Keiskei*.

- Mr. T. B. McClelland, Puerto Rico.—Plant of *Phlebotaenia Cowellii*.
- Lt.-Col. L. C. R. Messel, Nymans.—Shrubs.
- Dr. John Muir, Riversdale, South Africa.—Drift seeds for growing on for determination, believed to be Convolvulaceous.
- Mr. H. Murdock, Perth, Western Australia.—A collection of seeds of native plants.
- Mr. C. T. Musgrave, Godalming.—Plants and seeds.
- Mr. H. Nalder, Cork.—A collection of plants of *Cotyledon* species and varieties.
- Col. George S. T. Napier, Horeham Road, East Sussex.—Bulbs, corms and seeds.
- Mr. Hugo Naudé, Worcester, South Africa.—Plants, cuttings and seeds of *Pelargonium* and *Arctotis* spp.
- Mr. G. C. Nel, Stellenbosch University, South Africa.—Plants of *Roridula gorgonias*, which unfortunately were dead.
- Sir Francis Newdigate, Nuneaton.—Plants of the "Geraldton Wax Flower," *Chamaelaucium uncinatum*.
- Major Albert Pam, Broxbourne.—Corms, bulbs, rhizomes and tubers from South America.
- Mr. Theodore Payne, Los Angeles.—Seeds of *Dendromecon rigidum* from San Fernando Valley, Sierra Nevada Mountains and Encinitas.
- Miss M. Peal, Ealing.—Stove and greenhouse plants.
- Messrs. Perry's Hardy Plant Farm, Enfield.—Plants, including a collection of aquatics—bulbs and seeds.
- Mr. R. L. Proudlock, Alnwick.—A collection of plants from Iceland.
- Mr. Percival W. Reynolds, Tierra del Fuego.—Seeds.
- Mr. G. C. Richards, Arica, Chile.—Plants of "Azapa" Orange.
- Mr. J. E. H. Roberts, London.—Collections of alpine plants and seeds including many species of *Sedum*.
- Mr. G. A. Rock, Jamaica.—Plants of *Dendrophyllax Fawcettii*.
- Mr. Lionel de Rothschild, Exbury.—Plants, including a collection from the Southern Appalachian Expedition: cuttings and seeds.
- The Right Hon. The Lord Rothschild, Tring.—Plant of *Doryanthes Guilfoylei*.
- Messrs. L. R. Russell, Ltd., Richmond.—Plants, including *Dipladenia Brearleyana* and *D. boliviensis* also tubers of *Gloriosa Russelliana*.
- Hon. Mrs. E. F. Ryder, Beaulieu.—Plants, bulbs and seeds.
- Messrs. Sanders, Bruges.—A collection of orchids and Begonias.
- Mr. C. J. Sibbett, Cape Town.—Plants of *Satyrium carneum* and *S. corrifolium*; seeds, including *Mesembryanthemum* sp.
- Dr. A. J. Simey, Penrith.—Plant of *Asplenium lanceolatum*.
- Miss Dora B. Stafford, Enfield.—Plants, bulbs and seeds collected in Peru.

Dr. F. Stoker, Loughton.—Alpine plants.

Mrs. Susan Stoker, British Columbia.—Bulbs of *Calyпсо bulbosa*, *Romanzoffia sitchensis* (seed also) and *Romanzoffia unalaschensis*.

Mrs. H. P. Thompson, Weybridge.—Plants of *Sempervivum* species from the Balkans.

Mrs. E. M. Tweedie, Kitale, Kenya.—Plants, including *Stapelia* species and corms of *Gladiolus* spp.

Brig. Gen. F. E. W. Venning, New Milton.—Seeds from Kashmir.

Messrs. K. Wada, Japan.—An interesting collection of seeds, including 9 species and varieties of *Lilium*, *Rhododendron Komiyamae*, *R. Metternichii*, *Leucothoe Keiskei*, *Menziesia ciliicalyx*.

Mr. Arthur Wade, Poole Range, Western Australia.—Seeds from the Fitzroy River area, including a climber, probably *Ipomoea* sp. from an extinct volcano.

Captain F. Kingdon Ward.—Seeds, plants, and bulbs.

Captain G. F. Warre, Roquebrune, A.M., France.—Plants and seeds.

Dr. J. Cromar Watt, Aberdeen.—Plants, tubers and seeds.

Mr. A. G. Weeks, Limpsfield, Surrey.—Plants of *Gentiana* species.

Mr. F. A. Weinthal, Roseville, New South Wales.—A collection of orchids.

Mr. W. A. West, Beirut, Syria.—Bulbs of *Colchicum*, *Crocus* and *Tulipa* spp., also rhizomes of *Iris antilibanotica*.

Mr. H. J. Yeats Wilson, Victoria, Australia.—A collection of Australian seeds.

Mr. R. W. Younger, Magallanes.—A collection of un-named plants, packed dormant and received at Kew in particularly good condition—considering the length of the voyage and that the plants had started into growth.

DISTRIBUTION OF PLANTS AND SEEDS.—In connexion with the usual annual distribution of seeds, 173 consignments were despatched at the commencement of the year, comprising 6027 packets of herbaceous plants and 3936 packets of trees and shrubs. The aggregate shows a decrease of 181 packets as compared with the figures for the previous year.

Species specially distributed were *Leptospermum scoparium*, from New Zealand, *Artemisia brevifolia*, from Kashmir, *Pinus Torreyana*, from San Francisco, *Matthiola sinuata*, from Chalchidiki, Greece, *Sesbania speciosa* and *Aesculus indica*.

Shipments of plants overseas—mainly in Wardian cases—were as follows: Agricultural Departments of Bahamas (*Coffea stenophylla*); Bermuda; British Honduras; Gold Coast; Nyasaland; St. Helena; Trinidad (two consignments), and Uganda. Botanic Gardens of Christchurch, New Zealand (large collection of cuttings of species and varieties of *Salix*); New York; Peradeniya; Singapore, and Wellington (New Zealand). Government House Gardens of Tanganyika Territory and Zanzibar; Government

Gardens, Khartoum ; The University, Hong Kong ; East African Agricultural Research Station, Amani (2 consignments) ; Imperial College of Tropical Agriculture, Trinidad (Banana suckers) ; and Mr. H. B. Sharp, Kenya. In addition a consignment of *Cassava* cuttings from Trinidad was reshipped to Nigeria (likewise a large collection of seeds of *Sorghum* species and varieties from Tanganyika), also a large consignment of seeds of mahogany from Barbados to Egypt.

Other recipients of plants, etc., included the following :—

Institutions :—

- Adelaide University, South Australia.—A collection of seeds of drug-producing plants.
- St. Andrews University, Department of Botany.—A collection of orchids.
- Belize, Department of Agriculture, British Honduras.—Propagating material of ginger and arrowroot (Queensland and West Indian varieties).
- Benmore Gardens, Argyllshire.—Plants of *Magnolia Wilsonii*, *Davidia Vilmoriniana*, *Aesculus indica* and *Rhododendron viscosum*.
- Berlin-Dahlem, Botanic Gardens.—Grafts and cuttings of hardy trees and shrubs.
- Government Gardens, Bikaner, India.—Seeds of *Victoria regia*.
- Bristol University.—A collection of stove and greenhouse plants.
- Cambridge University Botanic Garden.—Plants, seeds and cuttings, including *Sarracenia* spp., *Cephalotus follicularis*, *Darlingtonia californica*.
- Chelsea Physic Garden, London.—A collection of Pinguiculas and herbaceous plants.
- Coimbra Botanic Gardens, Portugal.—Seeds of *Victoria regia* and *Quercus* spp.
- East London College, Department of Botany.—Herbaceous plants and seeds.
- Edinburgh, Royal Botanic Garden.—Plants, seeds and cuttings, including *Nepenthes* spp.
- Egypt, Ministry of Agriculture, Giza.—Plants including *Medinilla magnifica*, *Dahlia imperialis* and *Tibouchina semidecandra*.
- Fleetwood, Lancs., Parks Department.—Plants, seeds and cuttings, including *Davidia Vilmoriniana*, and *Magnolia Wilsonii*.
- Glasgow Botanic Gardens.—Plants of *Pelargonium* spp., *Streptocarpus Rexii* and *Pinguicula* spp.
- Glasnevin Botanic Gardens.—Plants, seeds and cuttings, including *Coleonema virgatum* and *Derris elliptica*.
- The Green Cross Society, 47, Victoria Street, S.W.1.—136 packets of seeds of British native plants.
- Harpenden, Plant Pathological Laboratory.—Seeds and seedlings of *Lilium* spp.

- Hastings, Parks and Gardens Department.—A collection of *Mesembryanthemum* spp.
- Hyde Park, London.—Plants, seeds and cuttings, including *Meconopsis chelidonifolia* and hardy trees and shrubs.
- John Innes Horticultural Institution, Merton.—Plants, seeds and cuttings.
- Kenya Colony, Department of Agriculture, Nairobi.—Tubers of *Helianthus tuberosus* and *Cyperus esculentus*.
- King's College, Cambridge.—Flowering shrubs.
- Kirstenbosch, National Botanic Gardens, South Africa.—Seed of *Rhus coriaria*.
- Kornik, Department of Dendrology and Pomology, Poland.—A collection of cuttings and scions of hardy trees and shrubs.
- Leningrad, Jardin Botanique, U.S.S.R.—Seeds of *Victoria regia*.
- London County Council, Parks Department.—A collection of alpine and herbaceous plants.
- The National Physical Laboratory, Teddington.—A collection of hardy shrubs.
- Nigeria, Department of Agriculture, Ibadan.—Plants of *Agave amaniensis*, received at Kew from Amani.
- Nyasaland, Department of Agriculture, Zomba.—Tubers of *Dioscorea* spp.
- Police Training College, Hendon.—A collection of trees and shrubs.
- Reading University.—A collection of trees and shrubs.
- Richmond, Surrey (Terrace Gardens).—Trees and shrubs.
- Rothamsted Experimental Station, Harpenden.—A collection of Azaleas.
- The Royal Aircraft Establishment, South Farnborough, Hants.—A collection of hardy trees and shrubs.
- The R.A.M.C. Nursing Sisters' Home, Woolwich.—A collection of 250 hardy trees and shrubs ; also herbaceous plants.
- The Royal Military School of Music, Kneller Hall, Twickenham.—Hardy trees and shrubs.
- St. Helena, Department of Horticulture and Forestry.—Plants of *Pelargonium radula* var., and bulbs of *Urginea* spp.
- Swansea, Parks Department.—Camellias.
- Toronto University, Department of Botany.—Plants of *Pinguicula* spp., and *Drosera capensis*.
- Trinidad, Department of Agriculture.—Tubers of *Dioscorea* ; garden varieties of *Hippeastrum* and *Amaryllis Belladonna*.
- Washington, U.S. Department of Agriculture.—Seeds of *Phoenix reclinata*.
- Wellington Botanic Gardens, New Zealand.—Trees, shrubs and seeds of herbaceous plants.
- Wisley, Royal Horticultural Society's Gardens.—Seeds of *Iris* from the Mississippi Delta, alpine and herbaceous plants.
- Private Recipients :—*
- Lord Aberconway, Bodant.—Plants, including *Agapetes macrantha* and *Ceanothus cyaneus*.

- Mr. G. P. Baker, Sevenoaks.—*Iris* spp.
- Mr. W. Balchin, London.—A collection of *Eucalyptus* spp.
- Mr. L. S. Bartlett, Ascension Island.—A collection of seeds of herbaceous and decorative plants, and seeds of *Quercus Ilex*, *Hippophae rhamnoides*, and *Rosa* spp.
- Col. C. Beddington, Ospedaletti, Italy.—A collection of succulents.
- Mr. D. J. Bethell, Bahr el Ghazal, Sudan.—A collection of plants suitable for planting in the Bahr el Ghazal.
- Lady Muriel Jex-Blake, Nairobi.—A miscellaneous collection of plants.
- Dr. F. Boergesen, Copenhagen.—Rhododendrons and hardy shrubs.
- Sir Bernard Bourdillon, Uganda.—*Pelargonium* spp.
- Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames.—Cutting of hardy trees and shrubs.
- The Chandra Nursery, Sikkim.—*Oncidium* spp., and *Bifrenaria aurantiaca*.
- Mr. C. W. Chorley, Kampala, Uganda.—*Drosera* spp., (for research in control of tsetse fly).
- Prof. P. Chouard, Paris, France.—Bulbs of *Scilla* spp.
- Hon. Mrs. P. Spender-Clay, Lingfield.—*Lilium* spp., and plants of *Aster Pappii*, and *Veronica gentianoides*.
- Lord Clinton, East Budleigh.—Plants of *Aesculus indica*.
- Dartington Hall, Totnes (per Mr. R. S. Lynch).—Hardy trees, shrubs and herbaceous plants.
- M. Delacour, Clères, France.—*Echinocereus* spp., and *Echinopsis* spp.
- Mr. P. L. Dunsdon, Caledon, C.P., S. Africa.—Seeds of *Liliums*.
- Captain A. Dunston, Donhead St. Mary.—*Euphorbia* spp.
- Mr. Chas. Eley, East Bergholt.—Alpines, *Liliums* and hardy shrubs.
- Mr. Guy Fenwick, Stamford.—Plants of *Davidia Vilmoriniana* and *Aesculus indica*.
- Mr. N. Fogelvist, Kalmar, Sweden.—Orchids.
- Dr. P. L. Giuseppe, Felixstowe.—Plants of *Dahlia Merckii*, and *Caryopteris clandonensis*.
- Commander F. Gilliland, Londonderry.—Plants of *Arundinaria Murielae* and *Bambusa quadrangularis*.
- Sir Louis Greig, Richmond Park.—A collection of *Rhododendron* spp., and varieties.
- Mr. N. G. Hadden, West Porlock.—A collection of alpines.
- Mr. Cecil Hanbury, La Mortola.—Seeds and plants.
- Mr. F. J. Hanbury, East Grinstead.—Bulbs of *Amaryllis Hathor*.
- Marquess of Headfort, Kells, Co. Meath.—Plants, including *Stewartia malachodendron* and *Disanthus cercidifolius*.
- Messrs. Hillier & Sons, Winchester.—Seeds, plants and grafts of hardy trees and shrubs.
- Captain Collingwood Ingram, Benenden, Kent.—Hardy trees and shrubs, including *Prunus* in variety and *Liliums*.

- Hon. Robert James, Richmond, Yorks.—Plants of *Abelia triflora* and *Camellia saluenensis*.
- Major L. Johnston, Hidcote, Campden.—Bulbs, plants and cuttings.
- Lady Clare King, London.—Herbaceous plants and seeds.
- H.M. The King (for Windsor Great Park).—Hardy trees and shrubs.
- Knap Hill Nursery Ltd., Woking.—Plants, seeds and cuttings of hardy trees and shrubs.
- Mr. F. A. Lesser, Department of Puno, Peru.—Tree seeds for trial in Peru at an altitude of 4,000 metres.
- Mr. B. Levy, Wankie, Southern Rhodesia.—A collection of succulents and seeds of *Liliums*.
- Mr. H. Q. Levy, Jamaica.—A collection of orchids.
- Mr. T. Ashton Lofthouse, Linthorpe.—A collection of alpiners.
- Hon. D. Bowes-Lyon, Hitchin.—A collection of trees and shrubs.
- Captain N. McEhearn, Pallanza, Italy.—A large collection of hardy trees and shrubs.
- Colonel Meinertzhagen, London.—Plants from the garden of H.M. the King of Bulgaria.
- Lt.-Col. L. C. R. Messel, Nymans.—Plants of *Magnolia Wilsonii* and *Davidia Vilmoriniana*.
- Mr. F. W. Millard, East Grinstead.—Plants and cuttings of *Salix* spp. and alpiners.
- Sir F. W. Moore, Rathfarnham, Co. Dublin.—Plants of *Camellia saluenensis* and *Rhododendron* spp.
- Mr. J. B. Murray, Brooklyn, U.S.A.—Seeds of *Ilex* spp.
- Mr. C. T. Musgrave, Godalming.—Alpiners and herbaceous plants.
- Mr. James MacGregor, Glasgow.—Hardy trees and shrubs.
- Mr. G. W. Olive, Dauntsey's School, West Lavington.—A large collection of herbaceous plants and seeds.
- Mr. Courtney Page, The National Rose Society, Haywards Heath.—Plants of *Rosa* spp.
- Major A. Pam, Broxbourne.—Seeds of *Iris* spp.
- Mrs. N. E. Parry, Newton Abbot.—Plant of *Rhododendron Parryi*.
- Messrs. Perry's Hardy Plant Farm, Enfield.—A collection of aquatic plants.
- Earl of Powis, Welshpool.—Plants of *Aesculus indica*.
- Sir John Ramsden, Ravenglass, Cumberland.—Plants of *Clematis Armandii* and *Acer* spp.
- Lady Rankine, Zanzibar.—Plants, including *Tibouchina semidecandra*, *Ixora Dixiana*, seeds and corms.
- Mrs. J. M. Richardson, Chesham Bois, Bucks.—A collection of arctic plants. (The recipient is a descendant of the arctic explorer, Sir John Franklin).
- Mr. J. E. H. Roberts, London.—A collection of plants and cuttings of *Sedum* spp., and varieties.
- Mr. G. A. Rock, Jamaica.—Orchids.
- Mr. Lionel de Rothschild, Exbury.—Seeds of *Iris* spp., and plants including *Rhododendron nipponicum* and *Hibiscus Scottii*.

- Messrs. L. R. Russell, Ltd., Richmond.—Stove plants and Nymphaeas.
- Messrs. B. Ruys, Ltd., Dedemsvaart, Holland.—Plants of *Rhododendron impeanum*.
- Hon. Mrs. E. F. Ryder, Beaulieu.—Seeds and plants, including *Berberis Nevinii*.
- Mr. F. S. Sandeman, Kingennie, Angus—Seeds of *Liliums*.
- Messrs. Sanders, St. Albans.—Cuttings of *Begonia* spp., and plants of *Calanthe Regnierii*.
- Mr. F. W. Schumacher, Jamaica Plain.—Seeds of Rhododendrons.
- Mr. T. Sharp, Westbury.—Succulents.
- Messrs. W. C. Slocock, Ltd., Woking.—Plants, seeds and cuttings of trees and shrubs, including *Nothofagus* spp.
- Dr. C. Skottsberg, Göteborg, Sweden.—*Pelargonium* spp., succulents and greenhouse plants.
- Mr. H. J. Solomon, Sydney, Australia.—Plants of *Cotyledon* spp. and *Echeveria devensis*.
- Abbé Souillet, Milly-Gennes, M. et L., France.—Seeds of *Lilium* and *Nomocharis* spp.
- Mr. H. Stacey, London.—Acorns of *Quercus Ilex* and *Q. Cerris* for Lundy Island.
- Major F. C. Stern, Highdown.—Plants, including *Coronilla viminalis* and *Prostranthera coccinea*.
- Mr. J. E. H. Stooke, Hereford.—*Nomocharis pardanthina* var. *Farreri*.
- Messrs. Sutton & Sons, Slough.—A collection of seeds of *Lilium* spp. and plants of hardy trees and shrubs.
- Lt.-Col. E. Tennant, Elgin.—Plants, including *Zephyranthes candida* and *Rosa virginiana*.
- Mr. R. D. Trotter, Ockley, Surrey.—Hardy trees and shrubs.
- Messrs. R. Veitch & Son, Ltd., Exeter.—Hardy trees, shrubs and herbaceous plants.
- H.R.H. The Prince of Wales, Fort Belvedere.—Plants of *Aesculus indica*, *A. californica* and a collection of *Camellia* spp. and varieties.
- Messrs. R. W. Wallace & Co., Ltd., Tunbridge Wells.—Grafts of Rhododendrons and trees and shrubs.
- Major H. F. Ward, Nairobi.—Plants, including *Ipomoea digitata*, and *Aphelandra* spp.
- Captain G. F. Warre, Roquebrune, A.M., France.—A collection of plants, including *Pelargonium* spp., trees and shrubs.
- Mr. A. G. Weeks, Limpsfield, Surrey.—*Gentiana Farreri* and alpine plants.
- Mr. F. A. Weinthal, Roseville, New South Wales.—Orchids.
- Mr. H. J. Yeats Wilson, Australia.—A collection of alpine and herbaceous plants.
- Mr. P. D. Williams, Lanarth.—Plant of *Telopea truncata*.
- Lt. Colonel M. Wingfield, Oxford.—Dendrobiums.

Bedgebury.

The effects of the abnormally dry winter of 1933-34 following the dry summer of 1933 resulted in the drains, ditches and springs drying up very early, and although there was an average rainfall in August, with heavy showers breaking up dry periods later, it was not until late November that water began to rise in springs and there was a slight flow in the ditches. However, no plants suffered seriously and it was only necessary to provide water for a few large rhododendrons planted during late spring.

Two rooms in Park House were renovated for the use of the Pinetum committee from Pinetum funds. The rooms have been furnished and a beginning has been made in building up a collection of dried specimens and cones of conifers for the use of students. The rooms are now available for anyone wishing to study at Bedgebury. Moreover, an arrangement has been made with Mrs. Nelmes, the wife of the Forester, whereby a bedroom will be available for anyone wishing to stay for a few days.

A range of brick sheds below Park House has been transferred to the committee for Pinetum use. As the sheds were in poor condition they were reroofed and put into reasonably good repair.

A good deal of work has been carried out in the removal of tree butts and young birch stools from the Pinetum, and the ground around Park House has been cleaned up, part of it trenched and planted with decorative trees and shrubs, and the other ground levelled and prepared for sowing with grass seed next spring. Two additional acres of ground have been prepared for planting with various spruces and firs in February.

Cold winds in early spring killed a young tree of *Pinus patula*, indicating that there may be great difficulty in establishing this species.

Young trees of *Pinus Montezumae*, *P. palustris* and *P. Torreyana* appear to have become well established although earlier planted trees failed. They were kept in pots until one year old then planted out and protected in winter. They have been planted three years. *Keteleeria Davidiana* is not yet established although two plants are alive. One plant of *Taiwania cryptomerioides*, planted in 1926, continues to grow slowly and seems to have improved in health during the last two years.

Honey fungus (*Armillaria mellea*) continues to take toll of the trees and more than a dozen well-grown young specimens died from its attack during the year. Unfortunately many dead tree butts exist throughout the Pinetum, and the harmful effects of this fungus may be felt for many years. A few losses have also occurred through Weymouth pine rust (*Cronartium ribicolum*).

Dreyfusia nüsslinii on silver firs, the larvae of *Dichomeris marginella* on junipers, pine-shoot moth caterpillars (*Retinia* spp.), and pine saw-fly caterpillars (*Lophyrus pini*) on pines, have been the most troublesome insect pests. Green spruce aphid was less trouble-

some than usual, though it appeared on a few trees in late summer and seemed to be spreading in autumn. It is difficult to control in showery weather, for spraying is then of little use.

Visitors to the Pinetum continue to increase, and there is evidence that the collection of conifers is becoming well known and appreciated. A visit was paid in May by the Society of Foresters of Great Britain, and the members were greatly interested in both the Pinetum and the forest plots.

Notices have been posted in conspicuous places prohibiting smoking in the Pinetum with a view to reducing the possible risk of fire when vegetation is dry. The danger of fire is one of the most difficult problems with which the Pinetum committee has to contend, and it is very necessary that visitors should understand the need for extreme care in this direction.

Two years ago a number of surplus water lilies were taken from Kew and planted in Marshall's Lake : they flowered very freely from early summer until late autumn and attracted many people. *Rhododendron ponticum*, as undergrowth, was also very effective in June.

The Museums

Routine work has taken up most of the time of the staff, but arrangements were made for the Keeper to serve on several forestry committees, and Mr. F. N. Howes was delegated to act for Kew on the Minor Forest Products Committee of the Imperial Economic Committee, and on the Crude Drugs Committee of the Pharmacopoeia Commission.

Numerous additions have been made to the collections and several hundreds of specimens of hardy trees and shrubs have been collected, dried and mounted to add to the Arboretum Herbarium.

At the request of the Director of the Science Museum, South Kensington, a model in box-wood of a two-decker frigate, constructed from a draft by Sir John Henslow (at one time Chief Surveyor of His Majesty's Navy), and for many years on view in Museum 3, has been transferred on loan to the Science Museum. This type of ship was used in the navy in the early part of the reign of King George III.

Mr. J. H. Holland, F.L.S., who had occupied the position of Assistant since 1901, retired under the age limit on October 17th (K.B. 1934, 397). Mr. Holland entered the Gardens as a student gardener in 1894, and in 1896 was appointed Assistant Curator of the Botanic Station at Old Calabar, Niger Coast Protectorate (now Nigeria). In 1898 he was promoted to Curator in the same place, but he had to retire for health reasons in 1901. In October of that year he came back to Kew. He contributed numerous articles to the "Kew Bulletin" and is the author of "The Useful Plants of Nigeria." He revised and brought up to date Nicholls' "Text-Book of Tropical Agriculture" in 1929, and for some time

previous to retirement he has worked upon an enumeration of economic plants which it is hoped will be published in the "Kew Bulletin" at an early date.

Mr. Holland is succeeded upon the Museums' staff by Mr. R. Melville, B.Sc., Ph.D., Ph.C. (K.B. 1934, 397).

During the year the heating arrangements in Museum 2., which for many years were unsatisfactory, were remodelled and a new floor was put down in the Museum store.

The Keeper attended the annual meeting of the Royal English Forestry Society at Exeter in June, and read a paper on "Amenity Planting and the Preservation of Natural Woodlands" before the Forestry Subsection of the British Association in Aberdeen in September. Mr. F. N. Howes attended the annual meeting of the Museums Association at Bristol in July.

Duplicate Museum specimens have been distributed to Miss E. L. Acton, the Training College, Darlington; Dr. C. J. Bond, Leicester; Professor Braid, West of Scotland Agricultural College, Glasgow; Mr. Daniel, Chiswick Products, Chiswick; Miss P. Das, Maria Grey Training College, Brondesbury; Director, Science Museum, South Kensington; Mr. F. Dukes, Edgbaston; Captain Eckford, South Kensington; Mr. A. Ellis, Liverpool; Professor S. J. Record, Yale University; and Professor R. B. Thomson, University of Toronto.

PRESENTATIONS TO MUSEUMS.—Mr. R. Baker, Oxford; wood specimens of *Glochidion ramiflorum*, New Hebrides.

Mr. A. Benthall, Teignmouth: seeds of *Araucaria Bidwillii* grown in Tangiers.

Miss C. Brand, Richmond: polished seed of *Lodoicea sechellarum*.

Mr. I. H. Burkill, Leatherhead: jelly-like substance prepared from jack fruit (*Artocarpus integer*).

Director of Agriculture, Ceylon: sample of *Artemisia brevifolia* used in a factory at Baramulla, Kashmir, in making santonin.

Messrs. Chivers & Sons, Ltd., Histon: bottled fruits.

Director of Agriculture, Cyprus: seeds of *Rhus Coriaria*.

Mr. J. Dean, Victoria, B.C.: framed photographs of *Erythronium grandiflorum* and *Arbutus Menziesii*; also specimens and photographs of *Juniperus bermudiana*.

Miss M. C. Donkin, Reigate: Linnean Society medal, presented to Sir J. D. Hooker, 1898.

Miss A. Eastwood, Curator of Botany, California Academy of Sciences: seeds of *Pinus Torreyana*.

Director of Agriculture, Fiji: fruits of *Parinari macrophylla*.

Director, Forest Products Research Laboratory, Princes Risborough: specimens of Indian-grown wood of *Swietenia macrophylla*, etc.

Messrs. Gill & Duffus, St. Dunstan's Hill, London: pecan kernels as shipped from the United States in sealed vacuum tins.

Grace Produce Co., Ltd., Liverpool: two samples of vegetable ivory nuts.

Mr. F. N. Howes, Museums, Kew: specimens of various economic products.

Mr. C. R. James, Natal: pecan nuts grown in Natal.

Mr. L. W. Jennings, Manor Park, London: sample of "salip misiri" from *Eulophia* or *Orchis* spp.

Miss M. S. Johnston, Kew: fifty-three photographs of geographical and geological subjects taken in North America, and a table top inlaid in New Zealand woods.

Dr. A. Kerr, Hayes, Kent: collection of medicinal woods from Siam.

Messrs. Rowntrees, York: fruit and seeds of *Allanblackia floribunda* and *Pentadesma butyracea*.

Director, Botanic Garden, Singapore: specimens of wood.

Mr. J. R. Shabetai, Ministry of Agriculture, El Giza, Egypt: dried plants of *Artemisia herba-alba*.

Director of Agriculture, Tanganyika Territory: coffee fruits from the Uzungwa Forest, Iringa Province.

Jodrell Laboratory

The most noteworthy event has been a much needed extension at the east end of the laboratory, consisting of an artist's studio, photographic darkroom, and attendant's room, necessitating the demolition of the old attendant's room, photographic darkroom and greenhouse. A new and well-lighted greenhouse, in which plants will be grown for experimental purposes, has been erected at the south-west end of the building. The central heating and electric light systems have been modernized and the laboratory has been redecorated throughout.

The routine work has consisted chiefly in examining microscopically a wide range of botanical material with a view to establishing its identity. Early in the year a considerable amount of time was devoted to the detection of adulterants in commercial packets of herbs. The most striking discovery in connexion with this work was that packets of marjoram frequently contained a high proportion of what appeared to be *Cistus* leaves. It was also found to be possible by a quick examination of commercial samples of seed to separate those of Indian mustard (*Brassica juncea* Hook. fil. et Thoms.) from Indian rape (*Brassica napus* L. var *dichotoma*). Seeds which had been separated in this way were subsequently sown and the resulting plants identified at the Herbarium, demonstrating that an almost perfect separation had been effected. The wooden case of a clock, one of a large consignment the works of which had been put out of order by the deposition of a varnish, was found to be made of the wood of a species of *Dipterocarpus*. It seemed probable that the trouble was caused by the resinous

substance in the wood reacting with the lubricating oil of the clockwork to form a varnish which clogged the works. A portion of the wood of the tree under which Livingstone's heart was buried was identified as a species of *Parinari*. Chemical tests were carried out which proved that the flesh of the fruit of the cherry laurel (*Prunus lauro-cerasus*), unlike the kernels of the fruits or the leaves, does not contain a poisonous cyanophoric glucoside.

The collection of microscopical slides of different woods has been considerably enlarged by the incorporation of slides of over 200 Burmese woods, and of collections of woods from the Argentine, China and Central Africa. Further exchanges of slides have been made with the Imperial Forestry Institute, Oxford. Two sets of slides of Lauraceous woods were prepared for the Forest Research Institute, Kepong, Federated Malay States.

The various special investigations mentioned in the report for 1933 have been continued and some of them have been finished. The work on the structure of sandalwood and some other scented woods was completed, and an account is shortly to be published in the "Kew Bulletin." Papers dealing with the wood-destroying fungus *Polystictus versicolor*, K.B. 1934, 409, and with the structure of some Lauraceous woods from the Federated Malay States, by Mr. B. A. Jay, a visitor to the laboratory, have also been prepared. The work on the anatomy of *Centaurea*, carried out in connexion with the experimental work at Potterne, and a study of the embryology and seedling anatomy of *Ranunculus Ficaria*, have been continued. At the suggestion of the Director, the embryology and seedling anatomy of *Pinguicula* spp. is also being investigated on the same lines. Mr. W. R. Philipson continued his researches on the anatomy and morphology of certain grasses, and has published a paper (New Phytologist 33, 359: 1934) on the morphology of the lemma. Miss Taylor (Mycology), Dr. M. R. F. Manton (Cytology) and Prof. I. C. Skottsberg (Cytology) also worked in the laboratory during the year.

The Herbarium.

The number of specimens received during 1934 was slightly below the usual amount, no collections of outstanding size being purchased or presented. The most important feature of the year was the re-arrangement of the Library on a subject basis, a task which, though causing considerable inconvenience during the process, will greatly facilitate the consultation of the volumes. (See p. 42). For a note on Mr. Snowden's Sorghum work see p. 47.

EUROPE, NORTH AFRICA, AND THE ORIENT.

The year 1934 saw a reduction from the great number of specimens received for incorporation in the Herbarium in the previous year. 16,631 numbers (sometimes a single number needing 2 or 3 sheets in mounting), have been presented or purchased. This figure

includes 13,478 received for identification or verification, apart from single specimens or small parcels sent by correspondents. 14,028 sheets have been mounted and the laying in has been brought approximately up to date.

The genera *Fraxinus*, *Potentilla*, and *Lavandula* have been rearranged.

Excellent progress has been made with the identification of new material and a large proportion of the collections sent in by correspondents has been determined.

Large additions to the British collections have been made by members of the Herbarium staff and include plants from Suffolk, Gloucestershire, Norfolk, Warwickshire, Oxfordshire, Lincolnshire, Bristol district, Surrey, Alderney, and Ireland. Mr. and Mrs. H. Montford gave a valuable set of plants from Skye. Messrs. A. B. and A. K. Jackson presented a set of specimens from the herbarium of Mr. T. E. Routh, and Mr. H. J. Goddard continued to send plants from J. Ralfs's collection. Mr. C. H. Wright added to our material from Devonshire and Col. H. H. Johnston sent 50 specimens from the Orkney Islands. Miscellaneous British plants were received from Messrs. J. E. Cooper, H. S. Redgrove, F. Rilstone, Mrs. C. I. Sandwith, Mrs. M. L. Wedgwood, Miss M. Whiting, and Mr. J. E. Lousley. Specimens were also received from the Botanical Society and Exchange Club of the British Isles and from the Watson Botanical Exchange Club.

Important collections of plants (totalling over 2,000 numbers) from the Balkan Peninsula have been received during 1934. These include Greece (Mr. S. C. Atchley and Dr. P. L. Giuseppi) ; Albania (Mrs. R. V. Pennington and Dr. F. Lemperg) ; Thrace and Macedonia (Mr. H. G. Tedd) ; Montenegro (Mrs. F. S. Copeland and the Rev. and Mrs. H. P. Thompson), and Bulgaria, Yugoslavia, and Dobruja (Dr. E. Anderson). In addition the Director, accompanied by Dr. W. B. Turrill and Mr. N. Y. Sandwith, spent some three weeks on the Athos Peninsula, South Macedonia, investigating the spring flora and vegetation. Over 600 numbers of dried specimens and about 100 packets of seeds resulted from this visit.

Valuable sets of Central European plants have been presented by Mr. J. E. Lousley, and collections from the East Pyrenees by Mr. J. W. Wyatt ; from Majorca by Mrs. C. Moore Kennedy ; from Switzerland by Miss G. Thring ; from Iceland by Mr. R. L. Proudlock, and from France by Mr. S. Garthside and Miss M. E. Edmonds. Mr. H. D. Ripley has continued to add to the material collected by him in Spain.

The following collections have been received in exchange : Czechoslovakia, Flora Exsiccata Reipublicae Bohemicae Slovenicae, cent. 9, from the Masaryk University, Brno ; Estonia, 1st Map of Estonian Plants from Tartu University ; Palestine, Flora Palestinae Exsiccata, cent. 3, from The Hebrew University, Jerusalem ; Herbarium Florae U.S.S.R. (nos. 2801-2850), from the Leningrad

Academy of Sciences; and a valuable contribution, especially of critically named willows, from the Riksmuseum, Stockholm.

The most important collections from the Orient are those of Mr. E. K. Balls, made in Asia Minor. His 1738 numbers consist of well-collected and excellently preserved specimens. They add a great deal to our knowledge of the interesting and rich flora of eastern Asia Minor. Collections from Cyprus (Forestry and Agricultural Departments), Syria (Col. R. Meinertzhagen), Persia (Mr. A. C. Trott), Arabia (Mrs. H. R. P. Dickson and Mr. J. Fernandez), and Madeira (Dr. M. Grabham) have filled in gaps in our representation of the floras of these areas. A very valuable series of specimens collected in Morocco by Mr. A. Trethewy were presented by him.

The more important purchases, apart from Mr. E. K. Balls' collection, were of plants from the Aegean Islands (Dr. K. H. Rechinger); *Tiliae Exsiccatae Criticae*, fasc. 5 (Mr. T. O. Weigel); Tripoli and Lipari Is. (Prof. J. Bornmüller); Anatolia (Dr. W. Kotte) and Hauran (Vester & Co.). The Royal Horticultural Society presented the type material of Botanical Magazine plates and a valuable set, made by the late Dr. O. Stapf, of 389 sheets of peonies was presented by Mrs. Stapf.

One valued feature of the year's work is the continued interest of collectors in various places of botanical interest. Personal contact has been made between many of these collectors and members of the staff, which has led to continuity in collecting, improvement in methods of preparation, and many other advantages.

Miss D. A. Chaytor gave her services for a considerable part of the year. She assisted in the general routine work and has helped in the preparation of two papers. She is now engaged in a revision of the genus *Lavandula*.

Mr. W. R. Philipson, with the aid of a grant from the Department of Scientific and Industrial Research, is continuing his revision of the British species of *Agrostis* and their life-histories.

Publications.—*Aubrieta glabrescens* Turrill sp. nov. (Gard. Chron. 9 June, 1934, 384).

The occurrence of *Fraxinus Pallisae* in Western Thrace (K.B. 1934, 44).

The correlation of morphological variation with distribution in some Species of *Ajuga* (New Phyt. 33, 218 : 1934).

Modern aspects of taxonomic botany and recent researches on some British plant species (Sci. Journ. R. Coll. Sci. 4, 75 : 1934).

Variation and a variant of *Cerastium vulgatum* from Dorset (B.E.C. 1933 Report, 583 : 1934).

Botany of the Cambridge Expedition to Edge Island, S.E. Spitzbergen, in 1927, Part 1 (K.B. 1934, 30).

Additions to the Flora of Cyprus (K.B. 1934, 271).

On the Flora of the Nearer East : XV (K.B. 1934, 437).

ASIA.

CHINA, JAPAN AND NORTHERN ASIA.—Several thousand sheets have been mounted and a number of "types" and other specimens have been sent on loan to monographers, including all the material of *Meconopsis*, which has been examined by Dr. G. Taylor. The Chinese material of the genus *Salvia* has been determined by Dr. Elfriede Stibal of Vienna, and has been rearranged in the Herbarium in accordance with her recently published revision.

The most important collection received during the year is one presented by the University of California, Berkeley, consisting of 2323 numbers collected by Mr. J. F. Rock on the Tibetan borders of China. 560 of these specimens belong to the genus *Rhododendron* and 263 to the genus *Primula*. The Herbarium has been enriched by a further collection made by native collectors of the late Mr. George Forrest in South-West China (presented by Lord Aberconway); Hainan plants (coll. Dr. Eryl Smith) presented by Dr. A. F. G. Kerr; gentians from Kwangtung, presented by the Sun Yatsen University, and 17 syntypes of bamboos presented by the Tokyo Botanic Gardens.

Material of all available species of *Cyananthus* and of *Gentiana* from this area has been fixed for cytological investigation.

Research and Publications.—A key to the species of *Deutzia* Sect. *Mesodeutzia* (K.B. 1934, 177).

Botryostege: A new genus of Ericaceae, by the late Dr. O. Stapf (K.B. 1934, 191).

INDO-MALAYA.—Good progress was made in mounting and incorporating the accumulation of specimens from the Malay Archipelago and the Philippine Islands, but there remains a large quantity on hand owing to the receipt of further large consignments. The penultimate part of the "Flora of the Presidency of Madras," comprising the *Gramineae*, has been completed and was despatched to the press at the end of the year. The final part, containing the index, addenda, errata, etc., should be ready early in 1935.

The determination of the collection made by members of the 1933 Expedition to Mount Everest, comprising 353 numbers, was begun in January. Some 85 specimens from the highest elevations and from the Rongbuk Valley were first dealt with so that the names could be included in the expedition report, which was published during the summer. Over three-quarters of the collection has been determined, and two new species from Sikkim were recognised.

The elaboration of the collection made by the Oxford University Expedition to Sarawak in 1932 has occupied a considerable portion of the year. All the material loaned to specialists for determination (see report for 1933) has now been returned, and an account of the *Loranthaceae* by Dr. B. H. Danser, of Rijks Universiteit, Groningen, has already appeared (Rec. Trav. Bot. Neerl. *sp.* 31, 237-247: 1934). The identification of the *Gamopetalae* is now practically completed.

The results of work on this collection up to date have amply fulfilled the expectation, expressed last year, of a high proportion of novelties. It is hoped to figure two new genera in "Hooker's Icones Plantarum," and an article dealing with one of them in its wider aspects is now in the press for publication in the "Kew Bulletin."

Identification of Mrs. N. E. Parry's Garo Hills collection of 1929-30 and of Capt. Kingdon Ward's collection in Assam in 1928, continued; of the former about a quarter remains to be done and the latter was nearly completed.

Capt. Kingdon Ward's *Ericaceae* (collections 1924-31), have continued to provide material for investigation. A paper on the genus *Agapetes*, with special reference to his collections, will shortly appear, in the "Kew Bulletin," and five species of this genus (including four collected by him)* will be figured in the next number of "Hooker's Icones Plantarum."

Valuable acquisitions have been received from Professor E. Barnes, who has been making an intensive search in restricted areas in the South Indian Hills, devoting his attention mainly to specified groups. His carefully preserved specimens (many in formalin), with ample notes, have yielded several new species of *Arisaema*, *Impatiens* and *Sonerila* and cleared up confusion in some cases.

A large number of duplicates of Malay Peninsula and Archipelago plants was received from the Singapore Botanic Gardens; from Buitenzorg Botanical Gardens, through Dr. J. Lam, Director of the Rijks Herbarium, Leiden, and from the Arnold Arboretum. Duplicates from Mr. W. Koeltz's collection of Himalayan plants were received from the New York Botanical Garden. A further consignment of specimens was sent by the Forestry Department of British North Borneo, which will be determined in 1935.

A large number of sheets of South Indian species was presented by the Botanic Gardens, Calcutta; the Agricultural College, Coimbatore, and the Conservatore of Forests, Travancore.

The following smaller contributions were also received:—

INDIA.—*Presented*: Madras, by Mr. P. V. Mayuranathan (through the Madras Museum) and by Mrs. Macfarlane; Bombay, by Mr. C. McCann; Chittagong Hill Tracts, by the Rev. W. J. L. Wenger; Lushai Hills, by the Rev. R. A. Lorrain; various localities, by the Forest Botanist, Dehra Dun.

CEYLON.—*Presented* by the Rev. R. W. Barney (grasses).

INDO-CHINA.—*Presented*: Siam, by Dr. A. F. G. Kerr, Mr. H. B. Garret and the United States National Museum, Washington.

PHILIPPINE ISLANDS.—*Purchased*: Mr. A. D. E. Elmer.

Publications.—Plants new to Assam: VI (K.B. 1934, 90).

The genus *Notholirion* (Royal Hort. Soc. Lily Yearbook, 15: 1934).

Contributions towards a Flora of British North Borneo, by H. N. Ridley (K.B. 1934, 119).

* See K.B. 1935, 24.

New or little-known plants from South India : III & IV (K.B. 1934, 165 and 389).

Firmiana and Erythropsis by H. N. Ridley (K.B. 1934, 214).

Poa amboinica (K.B. 1934, 398).

AFRICA.

There has been little diminution in the number of specimens received from Tropical Africa, about 11,500 having been mounted and laid in. With the assistance available it has only been possible to deal promptly with the smaller collections, preference being given in the case of larger consignments to those most carefully selected and prepared. Although much more material is required from almost every part of the continent, the naming and subsequent work on badly prepared specimens without field notes is unprofitable, and except from very little known areas adds little or nothing of scientific value to the Herbarium. Collections sufficiently adequate for making 3-4 sets of duplicates with good field notes are most welcome, the critical work of the staff being thus made beneficial to other establishments by the exchange of duplicates.

The advantage of the separation of the tropical African species in the herbarium into the five geographical areas, especially in the case of large genera, continues to be demonstrated, and this arrangement is gradually being completed.

Work on the orchids and *Gramineae* for the final part of the "Flora of West Tropical Africa" has been continued, and a large part of the MSS. of the Appendix, containing an account of the useful plants of the area, is ready for printing. It is hoped to publish this and the last part of the Flora during the present year. Preliminary revision work on certain groups, such as *Acanthaceae*, *Leguminosae*, *Amarantaceae*, etc. is being carried out as time permits.

WEST TROPICAL AFRICA.—From this area over a thousand specimens were received, mostly for determination. Over a hundred grasses (including *Sorghum*) were communicated from the Gambia by the Director of Agriculture; from Sierra Leone, 107 specimens by the Director of Agriculture; from Liberia, 200 by the United States National Museum; from the Gold Coast, 345 specimens, some 280 of which were communicated by Dr. F. R. Irvine and 50 by Mr. C. Vigne; from Nigeria, about 160 specimens were received from the Forestry and Agricultural Departments and 120 from Messrs. A. J. Carpenter, I. D. Hepburn, D. R. Rosevear, and the Imperial Forestry Institute, Oxford.

CAMEROONS AND CONGO.—About 450 specimens, mostly named, have been received in exchange, mainly from the Brussels Botanic Garden, and specimens of *Lobelia* and *Senecio* from Dr. L. Hauman.

NORTH-EAST TROPICAL AFRICA.—Sudan ; Grasses, *Cyperaceae*, etc. from Mr. H. B. Johnston, in connection with locust investigations ; 20 specimens from Major G. Aylmer.

EAST TROPICAL AFRICA.—Uganda : Giant Senecios from Dr. G. N. Humphreys and Mr. P. M. Synge ; about 550 specimens from the Department of Agriculture, 90 from the Uganda Forestry Department, and about 50 grasses from Mr. H. B. Johnston. Kenya : about 1400 specimens for naming, chiefly from the Coryndon Memorial Museum, the Scott Agricultural Laboratories, the Forestry Department, Mr. A. M. Champion, Miss M. J. Mortimer, Mrs. D. R. Tweedie, and Mr. H. C. Sampson.

From Tanganyika Mr. Greenway has continued to send large collections (about 750 specimens) from the Amani Institute, and over 200 collected by him on Mt. Kilimanjaro ; and Mr. B. D. Burtt has contributed about 320 specimens (including valuable material of *Commiphora*) ; 325 duplicates of Mr. Burtt's plants were also received from the British Museum (Natural History) ; Mr. C. Gilbert Rogers contributed a further 50 plants collected by him on Mt. Kilimanjaro ; over 500 specimens were received from the Department of Agriculture, including 180 specimens collected by Mr. H. Gillman in the Bukoba district and 325 Sorghums ; Mr. H. Cary Gilson also contributed specimens from this area.

SOUTH TROPICAL AFRICA.—From Northern Rhodesia Mr. Trapnell has contributed nearly 300 specimens, including about 50 examples of *Sorghum*, and from Southern Rhodesia further consignments have been received from the Department of Agriculture (100 specimens), Mr. F. Eyles (187), and Mr. A. P. G. Michelmores (82). Mr. G. Gossweiler sent 25 specimens from Angola. About 70 specimens were received from the Director of Agriculture, Nyasaland. Except for collections made by the early explorers, the flora of Nyasaland is still very poorly represented in the herbarium, and good general collections are very much desired from this area.

Besides the above, a valuable set of duplicates of older collections was received from the Berlin Botanic Gardens and further general collections in exchange from the Imperial Forestry Institute, Oxford.

MASCARENE ISLAND.—The Imperial Institute contributed 16 specimens of essential oil plants from the Seychelles, and Mr. R. E. Vaughan a small collection of orchids from Mauritius.

Research and Publications.—Besides naming and laying-in of the current collections, the determination and enumeration of Mr. J. B. Gillett's fine collection from Somaliland and Abyssinia has been nearly completed. These plants have filled up many blanks in the representation of the flora of that region, especially of species described in recent years by Italian botanists.

Another part of the *Gramineae* for the Flora of Tropical Africa (pt. VI. of vol. IX.) was published on January 1st and considerable

progress has been made with pt. I of vol. X., for which the account of the genera of tribes *Arundinelleae* and *Aveneae* has been prepared.

The Type of *Ormocarpum Kirkii* (K.B. 1934, 42).

The Giant *Lobelias* of East Africa (K.B. 1934, 61 and 274).

Ochrocarpus madagascariensis (K.B. 1934, 88).

Notes of African Grasses : XV and XVII (K.B. 1934, 107 and 425).

A Botanical Reconnaissance in the Virunga Volcanoes of Kigezi Ruanda, Kivu, by Mr. B. D. Burt (K.B. 1934, 145).

New Trees and shrubs from Tropical Africa, by Messrs. A. C. Hoyle and H. Dunkley (K.B. 1934, 182).

African Orchids : VI (K.B. 1934, 205).

Further note of the genus *Kraussia* (K.B. 1934, 231).

New Material of Monotes *Kerstingii* from the Gold Coast, by Dr. Helen Brancroft (K.B. 1934, 233).

The Flora of the Libyan Desert (K. B. 1934, 281).

Tropical African Plants : XII (K.B. 1934, 301).

New combinations under *Copaifera* (K.B. 1934, 400).

Danthoniopsis Chevalieri, by C. E. Hubbard with A. Camus (Rev. Bot. Appl. Agric. Trop. 1934, 780).

SOUTH AFRICA.—About 1000 specimens were received from the National Herbarium, Pretoria, mostly for verification. Many of these (over 600) were collected as usual by Dr. E. E. Galpin. Another valuable contribution was a consignment of over a hundred specimens gathered in South-west Africa by E. Schoenfelder and R. Bradfield, whilst from Lund, Sweden, 160 specimens (including 115 grasses collected by Mr. T. Norlindh in S.W. Africa) and from Uppsala, 215 specimens collected by Mr. I. Ortendahl in S.W. Africa have been received. Further collections have been received for naming from Mr. F. R. Long, Port Elizabeth (312) and Miss Wilman, Kimberley (257). A further fine series of 530 specimens was received from Captain T. M. Salter, R.N. The Bolus Herbarium contributed 200 specimens and Dr. H. G. Fourcade 100. The Rev. F. A. Rogers contributed 58 South African grasses and nearly 200 specimens (including a collection of Kalahari duplicates) were received from the Transvaal Museum. 126 specimens were purchased from Mr. E. G. Bryant, Prieska Division. Specimens have also been received from Dr. J. Muir, Prof. R. H. Compton and Mr. J. B. Gillett.

Work was continued by Mr. R. A. Dyer on the Flora of Albany and Bathurst.

Research and Publications.—The Distribution of *Ipomoea Pes-caprae* and *Calystegia soldanella* in South Africa, by Dr. J. Muir (K.B. 1934, 44).

Notes on African Grasses XVI by A. P. Goossens (K.B. 1934, 195).

Notes on the Flora of Southern Africa : V (K.B. 1934, 264).

AMERICA.

During the year 7082 sheets were mounted and 6015 sheets were incorporated in the Herbarium.

Much work has been carried out on the flora of British Guiana. A second consignment of several hundred undetermined sheets was received from the Jenman Herbarium, Georgetown, and was dealt with, many being kindly presented as duplicates. The identification of recent collections of the Forest Department was continued, and a small collection from Roraima was also named. Assistance was given to Mr. T. G. Tutin in the naming of the important collection of the Cambridge University Expedition to British Guiana. In addition to the work of identification, revisions of the British Guiana representatives of *Swartzia* and *Byrsonima* were prepared.

Mr. G. B. Hinton has continued to forward large consignments of fine herbarium specimens from the State of Temascaltepec, Mexico. The work of naming his vast collection has been undertaken since June by a member of the temporary staff who has made excellent progress and has succeeded in identifying and incorporating over two thousand numbers. Material of several critical families has been sent to specialists.

Other collections named during the year include those of Miss I. W. Hutchison from Alaska, of Mrs. M. E. Blake from Patagonia, and of Prof. F. E. Fritsch from the United States, and work has been begun on the plants of Miss D. B. Stafford's second Peruvian expedition.

Good progress has been made with the incorporation of old unidentified collections such as those of Hassler and Steinbach, and the following genera have been written up and re-arranged by recently published monographs: *Duguetia*, *Rollinia*, *Anaxagorea*, *Byrsonima*, *Talisia*, *Astronium*, *Malesherbia*, *Evolvulus* and *Aegiphila*.

Among the valuable series of specimens received through presentation, purchase or exchange, particular mention must be made of those of Dr. A. Ducke, from the Amazons regions, which include very numerous additions to the Herbarium.

The following collections were also received:—

NORTH AMERICA.—*Presented*: Canada, by Bernice P. Bishop Museum, Hawaii (coll. Dr. H. St. John); Miss K. J. H. Stewart (a collection made in Peterborough, Ontario, about 1840); J. W. Wyatt (Rocky Mountain plants, coll. A. Butler); Rev. H. A. Turner (Baffin Land plants); Canada and United States, by the Botanical Society and Exchange Club of the British Isles; United States, by the California Academy of Sciences (California and Oregon plants); New York Botanical Garden (California plants); Dr. F. A. Rodway, Nowra, New South Wales (California plants, coll. L. S. Rose); State College of Washington (N.W. Pacific plants); University of California, Berkeley (California and Nevada plants); University of California, Los Angeles (Southern and Lower California plants);

University of Montana (a large collection of Montana and Idaho plants collected by Drs. J. E. Kirkwood and C. L. Hitchcock, respectively) ; N.W. Greenland (Thule), by the Gray Herbarium (coll. W. E. Ekblau). *Purchased* : New York Botanical Garden, Florida plants ; H. A. Gleason Jnr., N. Michigan plants.

CENTRAL AMERICA.—*Presented* : By the Arnold Arboretum (British Honduras plants) ; by the University of Michigan Botanical Garden (British Honduras and Guatemala plants). *Purchased* : Wm. A. Schipp, British Honduras plants ; C. L. Lundell, British Honduras and Guatemala plants.

EAST TROPICAL SOUTH AMERICA.—*Presented* : By the British Guiana Forest Dept. (British Guiana plants). *Purchased* : New York Botanical Garden, Brazilian plants (coll. B. A. Krukoff).

WEST TROPICAL SOUTH AMERICA.—*Presented* : Colombia and Peru plants by Madrid Botanic Gardens. *Purchased* : New York Botanical Garden, Colombian plants (coll. A. E. Lawrance) ; University of California, Berkeley, Peruvian plants (coll. Mrs. Ynez Mexia.).

TEMPERATE SOUTH AMERICA.—*Presented* : Argentine plants by Señor A. L. Cabrera, Dr. H. Castellanos and Prof. A. Parodi (grasses).

Research and Publications.—The following papers have been published during the year :—

Specimens collected by Bradbury in Missouri Territory, by H. W. Rickett (K.B. 1934, 49).

Eugenia aeruginea DC., a misidentified type specimen (K.B. 1934, 124).

Ceratophytum tetragonolobum (K.B. 1934, 222).

Plant Hunting in Alaska, by Miss Isobel W. Hutchison (K.B. 1934, 345).

The genus *Swartzia* in British Guiana (K.B. 1934, 353).

Gaultheria microphylla (K.B. 1934, 401).

AUSTRALIA AND NEW ZEALAND.

During 1934 further collections have been presented by Dr. F. A. Rodway, about 400 specimens in all, the majority from New South Wales and Tasmania. A collection of New South Wales orchids was presented by Mr. F. A. Weinthal, and parts of the type of the very remarkable subterranean species *Cryptanthemis Slateri* were received from the Rev. H. M. R. Rupp.

In addition to specimens sent in connection with critical determinations and special enquiries, over 500 specimens have been received from Mr. C. T. White, Botanic Museum and Herbarium, Brisbane, more than 400 of these being grasses.

In connection with the investigation of the New Zealand and Australian species of *Gaultheria* and *Pernettya*, further material has been received from Miss L. M. Cranwell of the Auckland Institute

and Museum, New Zealand, and a paper embodying the results of these investigations has been published (Journ. Linn. Soc. **49**, 611 :1935.).

In addition to the above the following collections were presented :

AUSTRALIA.—Queensland, by the Arnold Arboretum ; Western Australia, by the Imperial Forestry Institute, Oxford ; by Mr. C. B. Palmer (grasses) ; by Mr. C. A. Gardner (co-types of new species) ; South Australia, by Mr. J. M. Black ; Victoria, a small set of Victorian plants by Sir Reginald McLeod.

NEW ZEALAND.—A collection illustrating the two forms of *Zoysia* and their range from sea-level to high altitudes inland, by Dr. H. H. Allan.

Research and Publications.—The genus *Dentella* in Australia (K.B. 1934, 290).

Notes on *Orthothylax*, by C. Skottsberg (K.B. 1934, 401).

Gramineae Australienses I & II (K.B. 1934, 126 and 444).

NEW GUINEA AND OCEANIA.

A small but interesting collection of some 50 specimens made on Nauru Island (Micronesia) was received from Mr. A. Burges. This is the first collection received at Kew from this island and nearly all the species proved to have a wide distribution in the Pacific.

The Hawaiian collections have been enriched by the presentation of 456 specimens (including 114 ferns) by the Bernice P. Bishop Museum, Honolulu, and about 50 from the Field Museum, Chicago. Over 300 specimens have been purchased from Dr. O. Degener, including many to be cited in his forthcoming "Flora of Hawaii."

In addition to over 50 specimens of *Ficus* from Fiji collected by Mr. A. C. Smith, presented by the New York Botanical Garden, Mrs. J. C. Parham has sent several collections from the same islands, amounting in all to over 200 specimens.

The work of determining the collections made by Mr. J. H. L. Waterhouse in the British Solomon Islands and Bougainville Island has been commenced, and identification of those presented by the Yale School of Forestry mentioned in the reports for 1932 and 1933 is well in hand. The orchids of both these collections were identified by Mr. C. E. Carr during six months' stay at Kew and a number of new species described. 123 specimens of *Ficus* from the Kajewski and Brass collections made in Bougainville and the Solomon Islands have been received from Brisbane Botanic Gardens. Nearly 300 of the late Dr. Rudolf Schlechter's New Guinea plants (including a number of co-types) have been purchased.

An interesting collection from the Owen Stanley Range, Papua, was presented by Miss L. E. Cheesman ; in addition a number of valuable duplicates of older collectors were received from the

Botanic Garden, Berlin-Dahlem, mostly from New Guinea (Kaiser Wilhelmsland). A number of duplicates of New Guinea plants was also received from the Buitenzorg Botanic Gardens through Dr. J. Lam, Rijks Herbarium, Leiden.

Research and Publications.—On a collection of orchids from the Solomon Islands, by C. E. Carr (K.B. 1934, 375).

PTERIDOPHYTA.

The largest collection received during the year was presented by the Department of Agriculture, British Guiana, consisting of about 2000 sheets belonging formerly to the herbarium of G. S. Jenman. The specimens are mainly extra-American and consist of sheets collected by, among others, Cunningham, Cuming, Gardner, Glaziov, Griffith, Hartweg, Jameson, Linden, Mosen, Schomburgk, Seeman and Spruce. A small proportion of the sheets have been injured by insects and these with some unlocalised specimens are unsuitable for incorporation in the Herbarium. Many type numbers are contained in the collection.

Other collections include nearly a hundred numbers from Papua collected by Miss L. E. Cheesman; a collection of Mexican ferns presented by Mr. R. Kempthorne, which apparently, at one time, belonged to the herbarium of Mr. H. Schlumberger of Mulhouse and which, therefore, were probably collected by Frederick Mueller; two books of Madagascar ferns sent by Mrs. C. Lyndon, one of which contained specimens collected by Miss Helen Gilpin, a missionary, whose main collection was already at Kew. Further excellent material has been received from Mr. G. B. Hinton from Mexico and a small number of duplicate sets of ferns have been received from various botanical establishments.

More than 1600 sheets were laid in during the year although many hundreds more have been arranged in alphabetical sequence of genera for future incorporation.

Research.—As far as routine work would allow, work on the fern flora of West Africa for the "Flora of West Tropical Africa" has been continued.

MUSCI, HEPATICAE AND CHAROPHYTA.

A special effort has been made during the year to make available the many valuable collections which have accumulated in the stores, and over four thousand sheets have been mounted.

Proposals for nomina conservanda of *Hepaticae* have been considered and after consultation with the members of the International Sub-committee, a scheme has been decided upon which it is hoped will be approved at the Amsterdam Congress.

Mr. G. O. Allen has kindly continued to co-operate in naming the *Charophyta* in place of the late Mr. James Groves, and almost all arrears of specimens have been dealt with.

The research on bryophyte ecology on the mountains in the Inner Hebrides has been continued and extended to the Outer Hebrides.

During the year a large number of Colombian mosses, collected by Messrs. E. P. Killip and A. C. Smith, was presented by the New York Botanical Garden. Series I, Musci Selecti et Critici, and Series 7, Hepaticae Selectae et Criticae, were purchased from Dr. Fr. Verdoorn.

Publications.—The Bryophyta of Scolt Head Island, in “Scolt Head Island” [published for the Norfolk and Norwich Naturalists’ Society], 146.

Riccia Beyrichiana in Arctic Europe (Journ. Bot. 72, 59).

The Vegetation of the Island of Rum (Proc. Linn. Soc. 146th Session, 27).

Musci collected by the Oxford Expedition to British Guiana in 1929, by P. W. Richards (K.B. 1934, 317).

THALLOPHYTA.

ALGAE AND LICHENS.—Considerable time has been occupied with naming critical material for research workers at Universities in this country. Of the two principal algal collections one concerns specimens brought up during diving operations in Loch Swen and the other marsh algae of Strangford Lough. In both cases these are connected with ecological investigations.

Prof. T. A. Stephenson, of Cape Town, has continued his ecological survey of marine algae along the South African coast and his collections have been supplemented by others sent by Mr. W. E. Isaac, who is engaged in similar work.

The set of *Phycotheca Boreali Americana*, consisting of 46 volumes and containing over 2000 specimens, has been removed from the Library shelves. The volumes are being cut up and the specimens remounted on herbarium sheets preparatory to incorporation in the general collection.

Among the lichens laid in was an interesting set of Philippine species determined by Wainio and including many syntypes.

Publications.—Indian Rhodophyceae especially from the shores of the Presidency of Bombay : IV, by F. Boergesen (K.B. 1934, 1).

The Lichens of Scolt Head Island, in “Scolt Head Island” Published for the Norfolk and Norwich Naturalists’ Society], 151.

FUNGI.—Additions to the Herbarium include Sydow’s *Mycotheca Germanica* (Fascicles 53–56) and *Fungi Exotici Exsiccati* (Fascicle 19) ; the 7th Century of *Reliquiae Farlowianae*, presented by the Farlow Herbarium, Harvard University ; a set of named specimens, including fragments of several types, presented by Mr. J. S. L.

Waldie, illustrating his work on the micro-fungi of forest trees ; and 156 specimens, chiefly *Uredineae* and *Ustilagineae*, distributed by the United States Department of Agriculture in co-operation with the University of Minnesota.

Among the larger consignments from abroad received for naming were fungi from India (Mr. C. E. Parkinson), Uganda (Mr. C. G. Hansford), Australia (Dr. Ethel I. McLennan) and South Africa (Division of Plant Industry, Pretoria). Of special interest was the receipt from Miss A. M. Bottomley (Division of Plant Industry, Pretoria) of further fertile material of a *Helicobasidium* which appears to be identical with *H. compactum* Boedijn. The latter was described from Java as a root parasite of coffee ; the South African fungus is reported as causing damage to *Pinus longifolia*.

Miscellaneous enquiries, which sometimes entail much time and trouble in elucidation, continue to be very numerous. The autumn of 1934 was a good season for fleshy fungi in this country, with the result that a very large proportion of time, especially during September and October, had to be given up to naming Agarics, etc. sent in by correspondents. One of the most interesting sendings was *Pleurotus mutilus* Fr. from mushroom beds, found by Mr. W. M. Ware. This is the second species reported by Costantin as causing the trouble known as "Chanci." The other is *Clitocybe dealbata*, which was found in some quantity last year by Mr. Ware and Mr. W. Buddin.

Eight new coloured plates of common British fungi have been prepared by Miss Wakefield for the new edition of Bulletin 23 of the Ministry of Agriculture, on "Edible and Poisonous Fungi." In connection with the preparation of a new edition of the "List of Common Names of Plant Diseases," by the Plant Pathology Committee of the British Mycological Society, considerable time has been given to the elucidation of some difficult problems of nomenclature and to the verification of authors and dates.

During the last two months of the year the provision of temporary help has enabled laying in to be brought up to date, and a further distribution of duplicates to be made. A start has also been made on providing new genus and species covers in the Herbarium where necessary, and repairing damage to specimens or packets. In some cases where bulky specimens such as polypores cause the sheets to be widely separated, the delicate pencil labels and notes of Berkeley are becoming almost obliterated. To save further damage it is proposed to go through the whole of the *Polyporaceae* and enclose all such specimens in large paper packets, with a duplicate label outside. This will make the rapid comparison of specimens less easy, but is the only sure method of preventing irreparable damage.

Professor A. H. R. Buller worked in the Herbarium from January until his return to Canada in September. During his year in England he published vols. 5 and 6 of his "Researches on Fungi."

Dr. J. Ehrlich, of Harvard University, who is engaged on a critical cultural and taxonomic study of *Nectria*, has for some months been working through the Kew collections and annotating the specimens which he has examined.

Mr. W. B. Grove spent some time checking references and specimens for his forthcoming work on British Coelomycetes.

Publications.—Entomogenous Fungi of British Guiana, by T. Petch (K.B. 1934, 202). Fungi collected in British Guiana, chiefly by the Oxford University Expedition, 1929 (K.B. 1934, 238). A study of *Polystictus versicolor*, by Mr. B. Alwyn Jay (K.B. 1934, 409).

BIOLOGICAL AND GENETICAL HERBARIA.

About 2300 sheets have been added to these collections during the year. These include: (1) additional material illustrating the ecological survey of Richmond Park; (2) large series of specimens to show the range of variation in salt marsh vegetation; (3) further specimens connected with breeding work in *Silene*, *Centaurea*, *Taraxacum* and *Solanum*; (4) a set of scored specimens to illustrate variation in an inland population of *Silene maritima*.

SUMMARY

The routine work, apart from naming, accomplished during 1934 is summarised as follows:—

Mounted	63,750 (approx.)
Incorporated	55,250 (approx.)
Duplicates distributed	9,016
Specimens received on loan	7,795
Specimens sent on loan	6,172
Specimens presented or purchased	50,915

ILLUSTRATIONS AND PORTRAITS.

Less routine work than usual has been done this year owing to the structural alterations and additions to the Jodrell Laboratory, mentioned elsewhere. A large studio and a new dark room and attendant's room have been erected; the work has caused considerable disorganisation, but the results are a valuable addition to the Laboratory.

Numerous type and authentic specimens borrowed from other Herbaria have been photographed for the Kew collection, and about 450 sheets of herbarium specimens and a fairly large number of living specimens have been photographed for other institutions.

Miss M. W. Tanner has been at Kew during most of the year

and has rendered valuable assistance to the artist. Three other visitors have worked for short periods on botanical illustrations :— Mr. R. H. Fry of Bristol, Miss H. M. Abecassis of Lisbon and Miss M. Paton of London.

The work of remounting the collection of drawings on Herbarium sheets, referred to in Kew Bulletin, Appendix, 1933, was completed during the year, and additional drawings and photographs were incorporated as they were received. These included :— 74 original water-colour drawings prepared for the Botanical Magazine, presented by the Royal Horticultural Society ; 30 plates from Dr. Pole Evans of the Flowering Plants of South Africa ; numerous Indian flower paintings bequeathed by Miss Carlina Leggett, and plates of Dioscorea species to appear in the Annals of the Royal Botanic Garden, Calcutta, presented by Mr. I. H. Burkill. An excellent named collection of 658 paintings of wild flowers of the Riviera and Switzerland (contained in cases) by Miss Sidney E. Forster, was presented by her niece, Miss A. E. Pepys. These have been catalogued and placed in the Library. A portfolio of 30 water-colour drawings of Cape wild flowers was received from Admiral Sir A. W. Moore and this also has been included in the Library. 59 photographs of type-species received from the New York Botanic Garden and 18 photographs of types in the De Candolle Herbarium received from Dr. A. F. G. Kerr, were placed in envelopes, mounted and laid into the Herbarium. A number of drawings and photographs received from many other sources were also incorporated.

Part 2 of vol. 3 of the fifth series of Hooker's *Icones Plantarum* appeared in November. The plates for this work were prepared by the artists on the staff.

NOMENCLATURE AND BIBLIOGRAPHY.

The enquiries received concerning nomenclatural questions were more numerous than in any previous year and the replies frequently involved much research.

In view of the change in the International Rules of Botanical Nomenclature concerning homonyms, whereby all later homonyms are rejected, a comprehensive paper is being prepared by Mr. A. Rehder (Arnold Arboretum), Dr. R. Mansfeld (Berlin), and Miss M. L. Green (Kew). A systematic search for later generic homonyms is being made, and a case either for the rejection or conservation of these names is being made out. The paper should be published shortly and will be submitted to the International Botanical Congress, Amsterdam.

The new edition of the Handlist of Rock Garden Plants was published in December. All the names have been carefully revised, the taxonomy is mainly in line with modern monographers and the nomenclature conforms to the International Rules of Botanical Nomenclature as revised at Cambridge in 1930. The scope of the list

is different from that of the last edition since it includes both Monocotyledons and Dicotyledons, as well as an Appendix of Trees and Shrubs suitable for Rock Gardens.

Publications.—*Nomenclature*: The Type of *Ormocarpum Kirkii* (K. B. 1934, 42).

Penstemon—the valid publication of the generic name (K.B. 1934, 43).

The validation of New Combinations by indirect citation of the synonyms concerned (K.B. 1934, 136).

Generic Names published in Zinn's Catalogue (K.B. 1934, 217).

Pseudogeneric names (K.B. 1934, 222).

New combinations from the Hand-List of Trees and Shrubs—(K.B. 1934, 224).

Poa amboinica Linn. (K.B. 1934, 398).

New combinations under *Copaifera* (K.B. 1934, 400).

Bibliography: Triana's *Flora Neo-Granadina* (K.B. 1934, 394).

INDEX KEWENSIS.

The compilation of the Ninth Supplement of the "Index Kewensis" progressed steadily during 1934. At the present time there are about 16,000 new names in the card catalogue, arranged alphabetically and available for consultation.

A large portion of the time of the compilers each year is given up to the investigation of omissions from the original "Index Kewensis" and subsequent supplements, notices of these omissions being very frequently received from correspondents both at home and abroad. This year, thanks to the Bentham-Moxom Trustees, some extra help has been received and many works, hitherto entirely omitted from the Index or included only in an unsatisfactory way, have been searched, and the new names contained in them will appear in the current supplement. Of these, special mention may be made of Engler & Drude, "Vegetation der Erde" (1908-21) which, owing to its encyclopaedic nature, had not previously been examined for new names. The result of this examination is the addition of over 500 names to the current supplement. The edition of "Roxburgh, *Flora Indica*" (1820-24), gone through for the Index appears to have been that of 1832, reference to the earlier edition in almost all cases having been omitted. It is therefore considered advisable to insert in the present supplement all new names from these two editions, quoting also the reference, if any, to the "Hortus Bengalensis" (1814) where many of the names appear for the first time as *nomina nuda*.

References to Vilmorin's "Blumengärtneri," ed. Siebert & Voss (1894-1896) have been received frequently, and therefore during the past year the volumes were purchased for the Library. Well over 500 names, mainly horticultural, have been abstracted from it and included in the present supplement.

EXPERIMENTAL AND TRANSPLANT WORK.

Genetical Research was continued at the Potterne Biological Station and at Kew on *Silene*, *Centaurea*, and *Saxifraga*. A large number of F_2 families was scored in *Silene* and many living specimens were analysed to find the range of variation in an isolated inland population of *S. maritima*. F_2 families of interspecific crosses in *Centaurea* were scored. Research was commenced on statistical genetics in *Saxifraga granulata*. Work on *Anagallis* at Potterne is being carried out by Mr. E. M. Marsden-Jones, Honorary Associate of the Royal Botanic Gardens. Investigation of micro-species of *Taraxacum* is continuing at Kew and a study of inflorescence inheritance in *Solanum dulcamara* has been completed.

The transplant experiments are being continued and a third report has been sent for publication in the "Journal of Ecology."

Publications.—Researches on *Silene maritima* and *S. vulgaris*: XIII. (K.B. 1934, 383.)

Further Breeding Experiments with *Saxifraga* (Journ. Genetics, 29, 265 : 1934).

VISITORS.

The number of signatures in the Visitors' Book for 1934—5,925—shews a considerable increase over 1933.

Miss M. M. Whiting again gave valuable voluntary help in arranging and classifying the Indo-Malayan material and similar assistance was given to the African Department for a few months by Miss M. R. F. Taylor, and to the European Department by Miss D. A. Chaytor. During the latter part of the year great assistance was given voluntarily by Miss M. D. Ker in labelling collections of Australian plants, and by Miss M. Gossling in sorting and laying in specimens in the Mycological Department. Mrs. E. Milne-Redhead has also kindly given assistance in preparing figures in connection with articles appearing in the Kew Bulletin.

Amongst frequent or regular visitors were members of the staffs of the Department of Botany, British Museum, and of the Imperial Mycological Institute. The Staff employed by the Royal Horticultural Society in connection with the preparation of the Index Londinensis and the Botanical Magazine have worked in the Herbarium and Library throughout the year.

In addition, the most noteworthy or frequent visitors to the Herbarium were the following :—

Dr. Edgar Anderson, Arnold Arboretum ; Mr. F. W. Andrews, Sudan.

Mr. E. G. Baker ; Prof. E. Barnes, Madras ; Miss E. C. Barnett ; Mr. W. J. Bean ; Mr. S. Bloembergen, Groningen ; Dr. F. Boergesen, Copenhagen ; Mr. L. A. Boodle ; Prof. C. E. B. Bremekamp, Utrecht ;

the late Dr. N. E. Brown ; Miss E. M. Bruce ; Prof. A. H. R. Buller, Winnipeg ; Mr. I. H. Burkill ; Mr. B. D. Burt, Tsetse Research Dept., Tanganyika Territory.

Mr. A. J. Carpenter, Nigeria ; Mr. C. E. Carr, late of Singapore ; Mr. C. C. Chang, Nanking ; Prof. E. E. Cheesman, Trinidad ; Prof. P. Chouard, Paris ; Mr. A. B. Cormack ; Dr. E. J. H. Corner, Singapore.

Dr. J. M. Dalziel ; Mr. A. G. Davis, Guelph, Canada ; Mr. F. C. Deighton, Sierra Leone ; Mr. H. N. Dixon ; Mr. H. Dunkley.

Mr. H. L. Edlin. Dr. J. Ehrlich, Cambridge, Mass.

Mr. F. Fagerlind, Stockholm ; Dr. H. R. Fletcher ; the late Mr. J. Fraser ; Mr. C. X. Furtado, Singapore.

Miss S. Garabedian, Cape Town ; Mr. H. S. George, Central Provinces, India ; Mr. F. D. Golding, Nigeria ; Dr. W. Balfour Gourlay ; Mr. P. J. Greenway, Amani, Tanganyika Territory ; Col. C. H. Grey ; Mr. W. B. Grove ; Mr. Evan R. Guest, late of Iraq.

Mr. R. E. Holtum, Singapore ; Dr. D. Hooper ; Mr. W. A. Horst ; Mr. A. C. Hoyle.

Miss J. B. Imray ; Dr. F. R. Irvine, Accra, Gold Coast.

Mr. A. Bruce Jackson.

Miss M. C. Karsten, Terborg, Holland ; Dr. A. F. G. Kerr.

Dr. J. Lanjouw, Utrecht ; Mr. I. M. Lamb ; M. Jacques Leandri, Paris ; Mrs. M. R. Levyns, Cape Town ; Miss G. J. Lewis, Cape Town ; Mr. J. E. Lousley ; Miss M. J. Lynn.

Mr. E. M. Marsden-Jones ; Dr. A. Meebold, Munich.

Mr. C. Norman.

Miss A. A. Obermeyer, Pretoria.

Mr. T. Petch ; Mr. W. R. Philipson ; Mr. W. R. Price ; Dr. A. A. Pulle, Utrecht.

Mr. H. J. A. Rea ; Prof. H. N. Rickett, Missouri ; Mr. H. N. Ridley ; Mr. C. Gilbert Rogers.

Dr. C. Skottsberg, Göteborg ; Mr. A. Skovsted, Trinidad ; Dr. C. Piper Smith, San Jose, California ; Dr. N. J. G. Smith, Grahamstown ; Mr. J. D. Snowden ; Miss M. S. Sprague ; Mr. W. T. Stearn ; Dr. C. G. G. J. van Steenis, Buitenzorg ; Mr. Duncan Stevenson, late of N. Rhodesia.

Mr. T. G. Tutin.

Dr. H. Uittien, Utrecht.

Dr. F. Verdoorn, Leiden.

Mr. E. F. Warburg ; Mr. R. O. Williams, Trinidad.

DISTRIBUTION OF DUPLICATES.

The following were the principal institutions to which duplicates were distributed :—

Great Britain and Irish Free State.—British Museum (Natural History) ; Dublin, Trinity College ; Edinburgh, Royal Botanic Garden ; Oxford, Imperial Forestry Institute.

Europe and Orient.—Berlin, Botanic Gardens and Museum ; Brno, Masaryk University ; Brussels, Botanic Garden ; Florence, Botanical Institute ; Jerusalem, The Hebrew University ; Leiden, 's Rijks Herbarium ; Leningrad, Botanical Museum of the Academy of Sciences ; Madrid, Botanic Garden ; Paris, Natural History Museum ; Sarajevo, State Museum ; Sofia, University, Department of Botany ; Stockholm, Botanical Museum ; Tartu, University Botanic Museum and Garden ; Utrecht, University Botanic Museum and Herbarium ; Zürich, Botanic Garden and Museums.

Africa.—Amani, East African Agricultural Research Station ; Nairobi, Coryndon Memorial Museum ; Pretoria, Division of Plant Industry.

Asia.—Peiping, Fan Memorial Institute of Biology ; Tokyo, Imperial University Botanic Gardens.

Australia.—Brisbane, Botanic Museum and Herbarium.

Oceania.—Honolulu, Bernice P. Bishop Museum.

America.—Harvard University, Arnold Arboretum and Farlow Herbarium ; Iowa, State University ; Pennsylvania, State College ; Washington, D.C., United States National Museum.

The Library.

The retirement, in the autumn of 1933, of Mr. S. A. Skan (see K.B. 1933, 462), for so many years *de facto* Librarian of the Royal Botanic Gardens, reduced the effective strength of the Library staff from three members to two. Considerable difficulty has accordingly been experienced in coping with the essential routine work, and this was enhanced by the absence of the Acting Librarian for a period of $4\frac{1}{2}$ months owing to a serious accident. Mr. Skan also filled the office (without the title) of official Bibliographer, and his unrivalled knowledge of the Library being no longer available, the situation has been met by a re-arrangement on a subject basis of all the books and pamphlets. This innovation has been greatly appreciated by all engaged in research in the Herbarium and Library, the practical convenience of placing together all books relating to one subject being obvious. Though highly desirable, this change entails, however, a serious (though fortunately non-recurrent) addition to the routine work, namely, entering in the Catalogue and its card-index Supplement the new press-marks of about twenty-three thousand volumes. No subject arrangement, however perfect, can remove the necessity for press-marking, since a particular book might be placed under any one of two or more different subjects with which it deals, and different sizes must perforce be placed on shelves of different heights and depths.

During the year, 541 volumes were bound, rebound or repaired, this number including 214 volumes representing War arrears bound under a special arrangement.

The extensive use made of the Library is indicated by the fact that as many as five hundred volumes are often absent from the shelves at the same time.

The most important publications presented to the Library during 1934 are as follows :—

From the Bentham-Moxon Trustees : 33 books in 35 volumes, including 14 scarce 16th century works. One of the most interesting is a copy of Manlius de Bosco, *Luminare maius*, Venice, 1506, issued, with a common title-page, along with Quiricus de Augustis, *Lumen Apothecariorum*, and Paulus Suardus, *Thesaurus Aromatariorum*, which, however, bear a second pagination. The *Luminare maius* was a pharmaceutical work highly esteemed in the Middle Ages, and mentioned in the *Botanologicon* of Euricius Cordus. Bibliographical details of the three books are given in Haller, *Bibliotheca Botanica*, 1, 238 (1771).

Paulus Aegineta, *Opus de Re Medica* is represented by translations by J. Guinterius, Paris, 1532, and Albanus Torinus, Basel, 1532. Stephanus, *Medicae artis principes*, Paris, 1567, is a very useful "omnibus" edition of the works of the chief Greek and Latin physicians after Hippocrates and Galen, including various authors cited by Brunfels and Fuchs, such as Oribasius, Aëtius, Actuarius and Celsus. Nicander's *Theriaca et Alexipharmaca*, Florence, 1764, has metric Latin and Italian translations accompanying the Greek text. Mesue's *Opera* is now represented by an edition printed at Lyons in 1534, the two editions previously in the Library being those published at Venice in 1562 and 1602 respectively. A notable lacuna was filled by the acquisition of Maranta, *Methodi cognoscendorum simplicium libri tres*, Venice, 1559. Another early medical work is Mattioli, *Epistolarum Medicinalium Libri Quinque*, Lyons, 1564.

The Kew set of Bock's works has been enriched by the acquisition of a copy of his *Kreuter Buch*, Strassburg, 1556, this being the first edition published after the author's death. Two other notable additions to the set of early herbals are Dodoens, *De Stirpium Historia Commentariorum Imagines*, Antwerp, 1559, an important edition containing additional figures, and the rare edition of his *Cruydt-Boeck* published at Leyden in 1608, which is not recorded in Pritzel.

Eobanus Hessus, *De tuenda bona valetudine*, Frankfurt, 1564, is an early work on dietetics, containing a section entitled "De natura cerevisiarum," in which twenty-four herbs are mentioned as ingredients of various "beers." Georgius Fabricius, *Rerum Misnicarum libri VII*, Leipzig, 1569, is a history of Meissen, Saxony, containing an alphabetical list (pp. 233-262), under their Latin names, with German synonyms, of the plants found cultivated or wild in the neighbourhood. Rapin's *Hortorum Lib. IV*, Meursius, *Arboretum Sacrum* and Politianus, *Rusticus* are included in a volume published at Utrecht in 1672.

Linnaeus, *Musa Cliffortiana*, Leyden, 1736, is a noteworthy acquisition. Other Linnean items are his *Genera Plantarum*, ed. 3, Paris, 1743; *Materia Medica*, ed. Schreber, Vienna, 1773, and *Termini Botanici*, ed. Giseke, Hamburg, 1781.

Among modern and nineteenth-century items presented by the Trustees are several useful illustrated works. Stupper's *Medicinisch-pharmaceutische Botanik*, Vienna, 1841, contains 120 coloured plates of medicinal plants included in the Austrian pharmacopoeia. Dupuis and Reveil's *Flore Médicale usuelle et industrielle du XIXe siècle*, ed. Lanessan, Paris [s.a.] is a useful work of reference containing 150 coloured plates. The set of Bonnier's *Flore complète de France Suisse et Belgique* presented by the Trustees in 1933 is now completed by the gift of the twelfth volume, comprising the Gramineae, Gymnospermae and Pteridophyta.

Barbazita's paper, *Saggio della flora Lucana*, Naples, 1847, contains the original description of *Seseli lucanum*. Hoehne's *Monographia das Asclepiadaceas Brasileiras*, fasc. I-II, Rio de Janeiro, 1916, deals with the genera *Oxypetalum* and *Calostigma*, and is illustrated by 58 photographic reproductions and 16 plates showing floral analyses.

Seyffert's *Dictionary of Classical Antiquities* ed. Nettleship and Sandys, London, 1894, includes a considerable amount of information regarding the daily life of the Greeks and Romans. Hartmann's *L'Agriculture dans l'Ancienne Egypte*, Paris, 1923, is illustrated by 76 figures, mostly reproductions from the ancient tombs, and has full bibliographical references. Fournier's *Voyages et Découvertes Scientifiques des Missionnaires naturalistes français*, Paris, 1932, includes accounts of botanical collectors such as Bodinier, Cavalerie, David, Delavay, Esquirol, Farges, Faurie, Huc, Perny and Soulier. Massart's *Une Mission biologique belge au Brésil* contains an ecological account of the Lower Amazons region illustrated by 681 figures of vegetation and individual plants. The *Mémoires de la Société de Biogéographie* I-IV include essays on the origin of the present floras and faunas of I. Corsica, II. High Mountains, III. British Isles, IV. Pacific Isles.

The Library is also indebted to the Bentham-Moxon Trustees for the continuation of various periodicals received in exchange for Hooker's *Icones Plantarum*.

The trustees of the British Museum have presented the following works:—*Catalogue of the books, manuscripts, maps and drawings in the British Museum (Natural History)*, vol. vii, supplement, J-O, 1933, *Catalogue of the works of Linnaeus*, by B. H. Soulsby, 1933, and the *London Clay flora*, by Eleanor M. Reid and Marjorie E. Chandler, 1933.

Lieut. Col. Sir. David Prain has sent the continuation of various periodicals, in addition to numerous pamphlets, as in other years.

From the Royal Horticultural Society has come its *Lily Year Book* (no. 3) for 1934.

The Rhododendron Association has presented its *Year Book*, with *Supplement*, 1934.

Some further publications, and a collection of portraits of botanists, have come from the estate of the late Dr. O. Stapf.

The New York Botanical Garden continues to send *Addisonia* and *Brittonia*, among other publications.

Volumes I and II of the *Flora U.R.S.S.* and other works have been given by the Botanical Institute of the Academy of Sciences, Leningrad.

The following books have been received from their publishers for review in the Kew Bulletin :—Cambridge University Press :—Agnes Arber, *The Gramineae* ; Jonathan Cape :—Edith Grey Wheelwright, *The physick garden* ; J. Duculot :—A. Barbey, *Une relique de la sapinière méditerranéenne le Mont Babor* ; Messrs. Macmillan :—J. Hutchinson, *Families of flowering plants, vol. II, Monocotyledons*, and A. B. Stout, *Daylilies* ; National Museum of Wales :—H. A. Hyde, and A. E. Wade, *Welsh flowering plants* ; The Pharmaceutical Society :—*British Pharmaceutical Codex*, 1934 (2 copies) ; University of Michigan Press :—L. E. Wehmeyer, *The genus Diaporphes*.

The Editor of *Nature* has presented the following : Barbara Briggs, *Some other friendly trees* ; H. F. Chow, *The familiar trees of Hopei* ; W. G. Craib, *Florae siamensis enumeratio*, vol. ii, pt. 2 ; A. Guillaumin, *Les fleurs des jardins* ; A. Howard, *A manual of the timbers of the world*, ed. 2. ; J. W. Moll, *Phytography as a fine art*.

The following important works were in most cases presented by their authors : C. A. Backer, *Onkruidflora der Javasche suikerrietgronden*, Afl. 1 and 2, and Atlas, Afl. 1–5 ; (from Mrs. Muir) ; L. H. Bailey, *Gentes herbarum*, vol. iii, fasc. 4 and 5 ; H. C. Bastian, *The origin of life* (from Mr. F. Ballard) ; Mrs. H. M. L. Bolus, *Notes on Mesembrianthemum and allied genera*, pt. 2, pp. 417–472 (3 copies) ; I. H. Burkill, *Tours* (several volumes) ; Crevost, *Catalogue des produits de l'Indochine*, tome v, fasc. 1 (from Dr. A. F. G. Kerr) ; J. Burt Davy, *A manual of the flowering plants and ferns of the Transvaal with Swaziland*, pt. II ; O. Degener, *Flora hawaiiensis*, 76 ff. ; R. E. Fries, *Revision der Arten einiger Anonaceen—Gattungen*, pt. III ; *Hand-list of Irish plants* ed. 3, 1934 (from National Museum of Ireland) ; L. Hauman, *Catalogue des Pteridophytes et Phanérogames de la flore belge* ; P. Herring (1) *Danske roser*, (2) *Studier i rosens kulturhistorie* and (3) *François Crepin* ; B. P. G. Hochreutiner, *Plantae Hochreutineranae*, fasc. II and III ; R. E. Holttum, and C. Christensen, *The ferns of Mount Kinabalu* ; J. Hutchinson, *Families of flowering plants, vol. II, Monocotyledons* ; H. H. Janssonius, *Mikrographie des Holzes, der auf Java vorkommenden Baumgarten*, Lfg. 11 ; J. de la Quintinye, *Instructions pour les jardins fruitiers et potagers, etc.* ed. 3, 1697 (from Mr. H. N. Ridley) ; A. Lemée, *Dictionnaire descriptif et synonymique des genres de plantes phanérogames*,

tome V ; J. M. Macfarlane, *The evolution and distribution of flowering plants*, vol. i ; M. Magalon, *Contribution à l'étude des palmiers de l'Indochine* (from Dr. A. F. G. Kerr) ; R. C. Marshall, *Trees of Trinidad and Tobago* ; Isa H. Martin, *Field Club flora of the Lothians* (from the Edinburgh Natural History Society) ; H. Moldenke, *Monograph of the genus Aegiphila*, and *Flora of Watchung, N.J.* ; S. Murbeck, *Mono-graphie der Gattung Verbascum* ; T. Nakai, *Flora sylvatica Koreana*, pars. xx, 1933 (from Forest Experiment Station, Government General of Chosen) ; J. A. Nannfeldt, *Studien über die Morphologie und Systematik der nicht lichenisierten inoperculaten Disconyceten* ; R. Pampanini, *Aggiunti alla Flora del Caracorum* ; J. Prokhanov, *Conspectus systematicus Tithymalorum Asiae Mediae* (from I. S. Prokhanoff) ; A. Pulle, *Flora of Surinam*, 4 parts (from K. Ver. Koloniaal Instituut, Amsterdam) ; H. N. Ridley, A number of scarce papers on arrow poisons ; J. T. Roig y Mesa, *Diccionario botanico de nombres vulgares cubanos* (from Mr. C. Jinarajadasa) ; K. Sawada, *Descriptive catalogue of the Formosan fungi*, pts., II-IV and VI (from the Department of Agriculture, Govt. Research Institute, Taihoku, Formosa) ; E. Silva Tarouca and C. Schneider, *Unsere Freiland-Laubgehölze*, ed. 3, 1931 (from Mr. W. J. Bean) ; E. E. Stanford, *Economic plants* (from Mrs. Grieve) ; N. Stoyanoff, and B. Stefanoff, *Flora of Bulgaria*, new ed., 1933 (from University Library, Sofia) ; G. Taylor, *The genus Meconopsis* ; R. J. Thornton, *British flora*, 5 vols. (from Mr. W. H. Mason) ; H. Weimarck, *Monograph of the genus Cliffortia* ; R. O. Williams, *Flora of Trinidad and Tobago*, vol. i, pts. 1-6, vol. ii, pt. 1 (from Department of Agriculture, Trinidad and Tobago) ; C. A. Zenkert, *Flora of the Niagara frontier region*.

The following are the periodicals, additional to those recorded in recent Reviews, which have been presented by the editors, societies or institutions issuing them, unless otherwise stated : *Anais do Instituto Superior de Agronomia*, vol. vi, fasc. 1 ; *Annales de la Société Linnéenne de Lyon*, tome lxxvii ; *Annals of the Agricultural Experiment Station, Government-General of Chosen*, vol. vii, no. 3 ; *Arbeiten der Mittelasatischen wissenschaftlichen Versuchsstation*, etc., L. I ; *Bericht über das Geobotanische Forschungsinstitut Rübel*, 1933 ; *Boletim do Ministerio da Agricultura*, Rio de Janeiro, Ano xxi, no. 2, and Ano xxii ; *Boletim de Pro-Cultura Regional S.C.L.* nos. 28, 29, and 33-37 ; *Boletim de la Sociedad de Historia Natural*, tome xxxiv, nos. 2-7 ; *Bothalia*, vol. ii, pt. 2 ; *British Fern Gazette*, vol. vi, nos. 7-10 (From Mr. C. H. Wright) ; *Bulletin Forestier Polonais* nos. 1-2 ; *Bulletin of the Government Botanical Garden, Nikita, Yalta*, nos. 11-15 ; *Bulletin of the Hemlock Arboretum*, nos. 7-8 ; *Bulletin of the Indian Lac Research Institute*, nos. 16-21 ; *Bulletin of the School of Forestry, Yale University*, no. 38 ; *Bulletin de la Société Française de Microscopie*, vol. i, no. 1 ; *Bulletin of the Tea Research Institute of Ceylon*, no. 11 ; *Carnegie Institution of Washington, Publication No. 450* ; *Contributions of the Council for Scientific and Industrial Research, Commonwealth of Australia*, nos. 2-15, 22-29, and 31-33 ; *Contributions from the Institute of*
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Botany, National Academy of Peiping, vol. ii, nos. 5-7; *Contributions from the Museum of Palaeontology, University of Michigan*, vol. iv, nos. 6-12; *Contribution from the Phytopathological Laboratory, Taihoku Imperial University*, nos. 1-12; *Contributions from the United States National Herbarium*, vol. xxvi, pt. 7; *Journal of the Imperial Fisheries Institute, Tokyo*, vol. xxv, no. 2, and vol. xxix, no. 2; *Journal of the Society of Tropical Agriculture*, vol. v, no. 4 and vol. vi, nos. 1 and 2; *Malayan Orchid Review*, vol. ii, no. 1; *Mededeelingen van het Botanisch Museum en Herbarium van de Rijks Universiteit te Utrecht*, nos. 10-14; *Mededeelingen van het Phytopathologisch Laboratorium "Willie Commelin Scholten"* xiii; *Mémoires de la Société d'Histoire Naturelle de l'Afrique du Nord*, nos. 2-5; *Memoir, Botanical Survey of South Africa*, no. 7; *Memoranda do Jardim Colonial de Lisboa* lxxii-lxxviii; *Memorias de la Sociedad Española de Historia Natural*, tome xiv, Mem. 5a; *Orchidologia Zeylanica*, vol. i, nos. 1-3; *Oxford Forestry Memoirs*, no. 17; *Proceedings of the Dorset Natural History and Antiquarian Field Club*, vol. xxvi, and xxxv-xxxvii (from Mr. H. J. Goddard); *Proceedings of the Isle of Wight Natural History and Archaeological Society*, vol. ii, pt. iv; *Publicaties van de Zuiderzeecommissie*, nos. 1-25 (from Dr. J. M. Sirks); *Publicationes Instituti Botanici Universitatis Jagellonicae Cracoviensis*, nos. 1-8; *Publications de l'Institut de Botanique Systematique, Université de Varsovie*, nos. 31-38; *Queensland Naturalist*, vol. ix, nos. 1-3; *Report of the British Association for the Advancement of Science 1933* (from Miss E. M. Wakefield); *Revista Española de Biología*, tom. ii and iii (nos. 1 and 2); *Revue Agrologique et Botanique du Kivu*, nos. 5-7; *Science Reports of the Tokyo Bunrika Daigaku, Sect. B.* nos. 15-27; *South Australian Naturalist*, vol. xv, nos. 1-4; *Studies from the Tokugawa Institute*, vol. iii, no. 1; *Transactions of the Hertfordshire Natural History Society and Field Club*, vol. xix, pt. iv; *Year Book of the Massachusetts Horticultural Society*, 1934.

As in former years many publications have been received from the Imperial Economic Committee, the Imperial Agricultural Bureaux, and from many agricultural, botanical, and forestry departments and institutions, at home, in the overseas Empire, and in foreign countries.

A large number of botanical papers reprinted from periodicals have also been received from their authors.

The Ordnance Survey Office, Southampton has continued to send maps of its new fifth (relief) edition, as they are issued. Further maps have also been presented by the War Office.

Mr. J. D. Snowden's work on the classification of the cultivated races of Grain Sorghums was completed during the year, and a paper describing the new types has been prepared for publication in the Kew Bulletin. A more comprehensive account, dealing with all the collections received at Kew during recent years, supplemented by specimens from various European herbaria, is ready for the press.

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